A STUDY ON THE USE OF COMPUTERS

BY LEGISLATORS

October 1992

A Report to the

53rd Legislature From the

Legislative Branch Computer System

Planning Council

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A STUDY ON THE USE OF COMPUTERS BY LEGISLATORS

A Report to the

53rd Legislature

from the

Legislative Branch Computer System Planning Council

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ORIGIN AND PURPOSE OF STUDY

House Joint Resolution No. 23 of the 52nd Legislature requested that the
Legislative Branch Computer System Planning Council (council) conduct an
interim study to plan for the productive use of computers by legislators.
(Appendix A contains the text of HJR 23.) Other provisions of HJR 23
were:

(1)   that the Council involve members of the Legislature in the study,
        through surveys and other appropriate means, to ascertain the types
        of applications that members would find useful in their work;

(2)   that the Council survey the directions taken by other states in
        providing computer support to their legislators and evaluate the
        potential for similar applications in Montana; and

(3)   that the Council submit recommendations and options, including
        budgets, for consideration by the 53rd Legislature to begin
        implementation by the 54th Legislature.

LEGISLATIVE BRANCH COMPUTER SYSTEM PLANNING COUNCIL
BACKGROUND

The council was established by House Bill No. 496 of the 51st Legislature,
which became Chapter 687, Laws of 1989, and was codified as Title 5,
chapter 11, part 4, MCA. The council is required to develop a computer
system plan for the Legislative Branch and submit the plan to each
successive Legislature. Appendix B contains Title 5, chapter 11, part 4,
MCA. Copies of the Legislative Branch Computer System Plan can be
obtained from the Legislative Council.

STUDY APPROACH

The council directed staff to collect information for the study from three areas:

(1)   a survey of the Legislature;

(2)   information on other states' activities in legislative automation; and

(3)   information on current computer activities in state government and the Legislative Branch, with an analysis of the impact this will have on the use of computers by legislators.

This information was collected and presented to the council at its April 2, 1992, meeting.

The council made the following observations:

(1)   The Legislative Branch currently has a significant investment in computer technology in support of the Legislative Branch staff, and this computer base could be built on to automate activities for legislators. There is a computer system planning process already in place (Legislative Branch Computer System Planning Council). There is already a computer technical staff in the Legislative Branch that can be built on.

(2)   There has already been some automation for legislators in both the House and Senate. During the 1991 Regular Session, the House set up a computer lab containing three personal computers (PCs) for use by Representatives. The Senate had PCs in two separate offices that were shared by the group of Senators in each of those offices.

(3)   Full implementation of a system for use by all 150 legislators could be very costly and could fail unless adequate planning and

implementation is done. The council agreed that a prototype should be done before full implementation takes place. The council suggested using a prototype consisting of at least two phases. Phase 1 is to continue for the 1993 session with the lab environment that was in place for the 1991 session, and phase 2 is the use of 12 notebook computers (6 for the House and 6 for the Senate) for the 1995 session. Additional prototypes may be necessary if all goals are not met in the first two phases.

(4)   Implementation of the system should be divided into phases, with each phase being implemented for each successive session depending on funding and the desires of the Legislature. The number of legislators having PCs and the functionality and data available for access could increase with each phase of the system.

(5)   Several policy and organizational issues need to be resolved as implementation progresses. These issues range from adequate office space in the Capitol Building for additional computer support staff to policies regarding the use of state-owned computers by legislators for campaign purposes. See the chapter on PLANNING AND IMPLEMENTATION ISSUES.

(6)   A cost estimate should be developed for:

       (a)   conducting the prototype for the 1995 session; and

       (b)   full implementation of the system for all 150 legislators.

The full implementation cost estimate would provide the Legislature with an estimated long-term cost of the system.

(7)   The number of legislators using PCs at their home or office continues to grow. Thus, many legislators prefer to do their work on a PC instead of using the traditional paper and pen method. There is already a demand by legislators to use PCs for legislative work, hence the request for this study.

The council agreed that the general description of the computer system for automation of legislator activities be as described below under SYSTEM CONCEPT.

LEGISLATIVE FUNCTIONS

An information system for the Legislature must be designed to help the legislators and legislative staff efficiently and effectively support legislative functions.

The functions of the Legislature are:

(1)   making laws through adoption of new laws, codification of laws established by courts, or amendment of existing laws;

(2)   overseeing the execution of the laws, thus serving as a check on the Executive Branch;

(3)   appropriating money to support the execution of laws and the provision of services;

(4)   representing the interests of local people and institutions at the state level;

(5)   proposing constitutional amendments, thus serving as a check on the Judicial Branch; and

(6)   developing state leaders.

There is currently a significant use of computers in the Legislative Branch by the legislative staff. Almost every staff member whose job can benefit from the use of a PC has one on his or her desk. Legislative agencies also use the Department of Administration mainframe for some of the larger computer

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processing functions. This Legislative Branch computer system (consisting of a wide variety of hardware, software, and applications spread across all of the legislative agencies) has been developed over the years to support the legislative functions described above.

Would providing legislators with computers continue to improve on these legislative functions? The answer to this question lies in how legislators would use the computer. The main use of the computer for legislators would be to access data in a timely manner so that this data could be used to make appropriate decisions. Computers can be used to give legislators access to bills, state financial data, the state laws, correspondence from constituents, etc. Receiving this data in a timely manner and using it both within the legislative process and to respond to constituents is clearly the best benefit of a computer system for legislators.

SURVEY OF LEGISLATORS

In March 1992, a survey of all 150 Montana legislators was taken. The survey was designed to gauge the current level of familiarity that Montana legislators have with computers, to ascertain what applications members would find useful in their legislative work, and to determine what level of support there might be for investing in computers for legislative members. Appendix C contains the results and an analysis of the survey.

LEGISLATIVE AUTOMATION IN OTHER STATES

To determine how other states are automating legislator activities, two sources of information were used. First, the National Conference of State Legislatures (NCSL) was contacted. They provided several articles on this subject. (See Appendix D.) Second, NCSL has been publishing a Computer Application Staff Section (CASS) Newsletter since 1988. Each state is asked to submit articles on the computer activities in their legislature to be published in the CASS Newsletter. Appendix D contains extracts from the

CASS Newsletter that offer insight into other states' legislative automation.

In general, the Montana Legislature is on par with other states in its automation of legislative staff activities. The majority of other state legislatures use PC and LAN technology to automate staff activities. Some states are using mainframe or midrange computers to automate staff activities. Other states are combining mainframe or midrange computers with PCs to achieve automation.

Automation of legislators' activities in other states is not as prevalent as automation of staff activities. However, there are a small number of states that have automated legislator activities of one type or another. The Michigan Senate is the best example of full automation of chamber (floor) activities of a legislature. (See the article in Appendix D.) Both Florida and California have computers in the local district office of each legislator. These states have very large data processing staffs, very large budgets, and usually full-time legislators. Some states allow the legislator to fund automation out of the legislator's office budget. In some cases, when the legislator's district office or State Capitol office is automated, it may be only the legislator's staff that is using the computer and not necessarily the legislator.

See Appendix D for more details on legislative automation in other states.

SYSTEM CONCEPT

This chapter describes the fully implemented system. Certain features of the system may be implemented in phases to accommodate funding constraints and the desires of the Legislature. The components of the proposed computer system for use by legislators would be as follows:

(1)   The major hardware and software components of the system would be IBM or IBM-compatible PCs attached to the Legislative Branch

Local Area Network (LAN) currently used by Legislative Branch staff. There are several benefits to this:

  (a)   The Legislative Branch already has expertise in LAN technology.

  (b)   PCs provide greater flexibility than nonprogrammable terminals.

  (c)   This configuration conforms to state government standards. Among the many benefits for this is the fact that the Legislative Branch will be able to communicate with almost all agencies in state government.

  (d)   Most people are familiar with a PC and PC software, and therefore, training requirements will be less.

(2)   Since not all legislators have private offices, PCs that fit on a legislator's chamber desk top, such as portable, laptop, or notebook PCs, would be desirable. Preferably, notebook PCs would be used. However, there are some concerns about notebook PC screen size and keyboard size. These are discussed under Technological Issues in the PLANNING AND IMPLEMENTATION ISSUES chapter of this report. These concerns should be ironed out in the prototype phase before further implementation takes place. See Appendix E for a description of portable, laptop, and notebook PCs.

(3)   The system would provide access to data and network services without regard to location; i.e., there would be jacks available to plug into the network in committee rooms, at the legislator's desk on the floor, in the legislator's office, and at other appropriate locations in the Capitol Building. Once plugged into the network, the PC would have access to the information and tools available on the network. Since the Legislative Branch Network is tied to the State Network, Legislators would have access to the Department of Administration mainframe and to most other state agencies.

[The legislator could also take the notebook PC home and access the Legislative Branch Network through telephone lines. Due to the slower data transfer speeds of telephone lines, this access may not be as fast or comprehensive as that provided through the network jacks in the Capitol Building.]

(4)   The system would provide access to the following information:
- Legislative databases
  - Bills
  - Bill status
  - Votes
  - Amendments
  - Committee minutes
  - Journals
  - Budget data
- Executive Branch databases
  - SBAS
- Constituent data
- Other data as identified by legislators

(5)   The system would provide access to the following tools to process the data:

- Word processing
- Spreadsheets
- Database
- Electronic mail (E-mail)
- Appointment/time scheduling
- Drawing, charting, graphing, etc.
- Constituent services
- Chamber automation (see article on the Michigan Senate system in Appendix D)

(6)   The system would provide access to printing capabilities. This can be provided either through centrally located network printers in the Capitol Building or through portable, locally attached printers.

(7)   Computer industry and state-standard equipment, software, and communications would be used to implement all phases of the system. This would prevent the use of cutting-edge technology, which typically has a higher risk than immediate pay off. Also, existing Montana law states that Legislative Branch and state government standards must be followed.

(8)   The system would be as user-friendly as possible. This will help accommodate the short training cycle requirements just before a session.

(9)   There would be provision in the system to accommodate legislators with sight or hearing disabilities.

PLANNING AND IMPLEMENTATION ISSUES

There are several issues that deal with the planning and implementation of the system as proposed in the chapter on SYSTEM CONCEPT. This chapter discusses technological, policy, and support issues as well as trends in the computer industry.

Technological Issues

This section describes issues associated with applying the technology of the proposed system described under the chapter on SYSTEM CONCEPT.

(1)   There is some concern about the screen size and keyboard size of a notebook computer. The screen is small and thus not as readable as the regular CRT used on a PC. If the paper process used in the

Legislature is eventually replaced by the system, will the notebook screen be readable enough to access this information through the notebook? The small size of the keyboard also presents problems for some people using the keyboard to input large amounts of data. The keys are closer together than a standard keyboard. Advances in technology for notebooks will solve some of the screen readability problems in the long term. The keyboard size problem will not go away if the small size of the notebook is to be maintained. The prototype process can be used to determine how critical these problems are.

(2) There are some short-term problems with wiring a network in the Capitol Building. The existing network uses twisted pair wiring. This is the lowest grade of wiring allowed for networking. There are some parts of the existing network that are not within wiring specifications. Networks that are not within wiring specifications are more prone to wire-associated outages. Adding several hundred network jacks to the existing network wiring structure in the Capitol Building could put the network considerably out of specification. Something needs to be done about the existing network wiring structure before full implementation of this system can take place.

The Information Services Division at the Department of Administration is responsible for all data network wiring for state government. They are aware of this problem and will take steps to ask for appropriate funding to correct the problem as an implementation schedule becomes more firm.

(3) If the notebook computer is used outside the Capitol Building where there is not access to network jacks, there will be a problem with the most appropriate way of loading and upgrading the software applications used on the notebook. All PCs on the existing Legislative Branch Network load software applications off of the network file

server. This approach makes upgrading to a new release of the software much easier since the upgraded copy only needs to be put on the file server. However, this approach only works when the PC has access to the high-speed communications of the network. This high-speed communication allows the software applications to load on the PC in a matter of seconds. When the notebook is taken outside the Capitol Building, the access to the high-speed communication network is no longer available. Access through telephone lines to the Legislative Branch Network is technically available; however, telephone lines are low-speed communications, and if the application software were to be loaded over these lines, it could take several minutes. On the other hand, if the application software is physically loaded on the notebook hard drive, this problem is resolved. However, then there is a problem with upgrading the software when the legislator has the PC at home for the interim. These problems may be solved in the future with faster modem speeds and an Application Program Interface (API) developed for this type of communication; i.e, the API describes and compresses the large amount of data necessary to work through slow phone lines.

(4)   There may be new technology developed that will be better at automating legislator activities than the proposed system. When and if this technology becomes available, the Legislature should make use of it if benefits can be derived from it and if it conforms to standards.

(5)   The hardware and software used in a computer system will need replacing over time. This time period is typically called the life cycle of a system.

PC hardware normally has a life cycle of 5 to 7 years. PC hardware needs to be replaced at the end of its life cycle for two reasons. First, the hardware is starting to wear out and thus maintenance costs are beginning to rise to the point that a new PC can be cost-

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justified. Second, PC software continues to offer more functions that require more hardware capacity to accommodate. Over a period of 5 to 7 years, the software will have advanced enough to almost bypass the capacity of the hardware. Many of today's popular software applications will not run on the original IBM PC/XT because it does not have sufficient disk space or processing power.

Software also has a life cycle. However, usually it is shorter than the hardware life cycle and full replacement is not always necessary. As the software vendors make improvements to their software to remain competitive and fix bugs, they offer these improvements as upgrades. The cost to upgrade to the new software varies, but is always less than the original purchase price. Most software vendors do not require that you upgrade immediately, however over time (usually from 1 to 3 years), they will drop support for the older releases of their software. This requires that an upgrade be made to maintain adequate support from the vendor.

As the end of the life cycle for the computer system used for legislators is reached, there will be costs for replacing the hardware and software.

(6)   Legislators will want access to several of the databases currently being used by the legislative staff. Examples of these databases are bills, bill status, MCA, votes, amendments, budget, etc. These databases were designed to accommodate a need by the legislative staff to process the data and provide the resulting information (usually in paper form). When the systems that created these databases were designed, they were designed for legislative staff use and not for general access by the legislators or by the public. The one exception to this is the bill status system, which is accessible both online and through reports to the legislators and general public. To provide access to the other legislative databases, a development

staff and funding to reprogram the systems will be needed.

Once the bills database is made accessible online, legislators could replace their current bills books by using PCs to access all versions of introduced bills. If a paper copy of a bill is needed, it could be printed on one of the laser printers centrally located in the Capitol. If all legislators eventually use notebook PCs to replace their bills books, the Legislature could switch to on-demand printing of bills. That is, instead of copies of the bill being printed in anticipation of the amount needed, copies would only be printed as they are asked for.

Policy Issues

This section describes areas in which the Legislature may need to consider setting policy.

(1)   There is already some policy dealing with the use of a legislator-owned PC on the network. During the 1991 session, the House prohibited it altogether. It is very tempting for the legislator to use their own PC because they already know all of the hardware and software features of it. However, there are compatibility issues in both the hardware and software areas that often require a larger amount of staff time to overcome. More often than not, the cost of this staff time outweighs the cost of providing the legislator with the training and equipment that meets the current Legislative Branch standards.

(2)   Should a policy dealing with use of a state-owned PC for the legislator's campaign or private use be established? Even if a policy is established, it will be difficult to enforce. Will legislators be willing to be subjected to an audit? How effective will an audit be at determining how the legislator is using the PC?

(3)   How much individual programming and system design work should be provided to an individual legislator? What if a legislator wants a system designed specifically for that legislator? This could become very costly. Who would determine which legislators have priority in using system development resources?

(4)   Should a committee of the Legislature be formed to address these issues or should it be done through the existing committee structure? The House and Senate Administration Committees currently have responsibility for these areas in the House and Senate, respectively. Is a joint committee needed?

(5)   Should a policy statement for public access to data and services be adopted by the Legislature? Once online access to legislative databases is available for legislators, it will be requested by the general public. What will be the additional system costs to provide access for the general public? How much, if anything, should the Legislature charge for access to this data? What data will be available for public access and what will not?

(6)   Although this study was requested on the use of computers by legislators, it should be recognized that legislative aides in place of legislators may be the key users of computers. Policy, support, and system development issues that have been developed for legislators would need to be reexamined for use of the system by legislative aides.

Support Issues

This section deals with issues related to supporting a computer system for legislators. All computer systems require a certain number of support staff to keep them running and to modify them to meet specific needs. The

current Legislative Branch ratio of number of PCs to support staff is somewhere between 30 to 1 and 40 to 1. This ratio varies from agency to agency. The ratio is also closer to 20 to 1 for the start of session because of the large number of new staff hired to use the network when no additional support staff is hired to accommodate this. This ratio implies that between 3.75 and 7.5 FTE will be needed to support 150 legislators with PCs.

(1)   How will legislators find the time for training when some are elected 2 months before the session begins? Freshmen legislators have a hard enough time just learning the current legislative process let alone a computer system. Should it be a requirement that a certain level of training be taken before a legislator is allowed on the system?

(2)   How can the need for a large support staff during session and a smaller one during the interim be accommodated in light of the fact that it may be difficult to hire computer professionals on a temporary basis? There is currently a large demand for trained people in this area. An alternative may be to contract for this service.

(3)   Because of relatively low salary levels, the state has had problems in the past with attracting and retaining qualified data processing professionals. Will this have an impact on implementing the system? Is this also an area in which services can be contracted for?

(4)   There is currently a problem with finding room for the staff and computer hardware of the current agencies in the Capitol Building. Where is there room for 3.75 to 7.5 additional computer support staff and computer hardware?

(5)   Should a help desk be established, and if so, how many hours a day should it be kept open?

(6)   What amount of up time will be expected for the system? The closer
        the requirement for up time gets to 100% the more costly it becomes
        to provide that level of up time. It may be necessary to establish a
        controlled environment computer room to ensure the amount of up
        time required.

Trends

There are several trends in the computer market and trends in state
government that have an impact on computer planning and implementation
in the Legislative Branch.

(1)   All trends in the computer market indicate that better computers are
        on the way. If the Legislature can wait to implement a system, more
        and better technology can be purchased per dollar spent.

(2)   Predictions are that display technology will advance to the point that
        it is as easy to read a document on the display as it is to read it on
        paper; i.e, displays will be close to the same resolution as the current
        laser printers.

(3)   Notebook computers are continuing to mature. They are getting
        smaller and lighter. Battery life is improving; however, it is still
        limited to 4 to 10 hours. Flat screen color displays have recently
        become available; however, they are currently high-priced compared
        to monochrome flat screens or compared to conventional color CRTs.
        Resolution and graphics capabilities for flat screens continue to
        improve to the point that they are only slightly behind CRTs.

(4)   The newer operating systems (Windows, OS/2, UNIX) will provide
        graphic user interfaces that will make the system more user-friendly
        and easier to learn.

(5)   State government continues to enforce hardware and software standards and continues to develop one statewide communications network. This will be of benefit to the Legislature in retrieving and using data from the different state agencies. If the Legislature uses the same software packages as the state standard and if the Legislature is attached to the state data network, the desired data can be retrieved across the state data network. Processing the data will not require conversion to another software package because the Legislative Branch will be using the same software as other state agencies.

(6)   There is new technology becoming available to help automate the personal productivity tasks of scheduling time, taking notes, keeping track of people and appointments, etc. One technology is a computer that is a flat pad housing a display screen that can be written on with a pen. These computers are much easier to learn to use than the PC and do not have a keyboard. The Newton computer from Apple and the ThinkPad from IBM are examples of this new technology. Although this is relatively new technology now, it could eventually be mature enough for use in the Legislature. This may be more appropriate technology for some legislators who do not want to take the time to learn how to use a PC. However, current versions will not automate as many of the legislator's activities as the PC can.

COST ESTIMATE

The cost estimate for this system is separated into two estimates:

(1)   a cost estimate for the entire system for the first 5 years. This will ensure that both the initial costs and the ongoing costs for the system are included in the overall cost. Five years was picked because this is the typical lifecycle for a PC.

(2)   a cost estimate for a prototype of the system for the 1995 session.

The cost estimate for the entire system will allow the Legislature to determine if it wants to proceed with this system based on the overall cost as weighed against the benefits to be derived.

If the 1993 Legislature decides to proceed with the system, then the cost of the prototype will have to be allocated in the FY 94-95 budget. Funding the prototype in the 1995 session feed bill will not provide the money soon enough to begin implementation of the system before the 1995 session begins.

The cost estimate for the prototype for the 1995 session is $136,235.

The cost estimate for full implementation of the entire system is $4,180,811.

Appendix F contains details of the cost estimates.

Cost Justification and Benefits

Many legislators suggested in their survey responses that savings in paper and printing costs would justify application of computers, but justification this way would be difficult. During the 1991 Regular Session, the total printing and distribution support for the Legislature cost approximately $378,310. About 17% ($62,000) of this was for printing and distribution to the public. Even if the printing and distribution is eliminated for the legislators and their staff, a printing and distribution function will still need to be maintained for the public. Also, until all legislators and their staff are using the system, paper printing and distribution will still be necessary for those who are not on the system.

Making legislators more effective in that they will have better access to the

data they need to make decisions on and providing an additional powerful communications tool appear to be the greatest benefits of a system. Can the cost for such a system be justified when the system will be used for 6 months every 2 years? If the legislators are allowed to take the PCs home, this may help justify the cost; however, this may raise some question about proper use of taxpayer-purchased equipment.

Will some legislators be tempted to use it for campaign and personal uses?

There are no other areas in which a large cost savings can be attributed to the implementation of this system.

RECOMMENDATIONS

(1)   If the Legislature chooses to proceed with the acquisition of computers for legislators, the system, as proposed under SYSTEM CONCEPT, should be implemented. Implementation of the system should be divided into phases, with each phase being implemented for each successive session depending on funding and the desires of the Legislature.

The number of legislators having PCs and the functionality and data available for access on these PCs would increase with each phase of the system. Early phases of the system would have only a few legislators using PCs. Later phases would have more, until all 150 were included.

(2)   The overall system complexity, high cost, and unresolved planning and implementation issues suggest that a deliberate, well-planned approach be taken to attain full implementation of the system. It is recommended that, at a minimum, 8 years (4 regular sessions) be taken to attain full implementation for all 150 legislators. It is also recommended that goals and objectives for each phase of the

the implementation be developed and adopted by the Legislature and that a report to the Legislature be made on how effectively the goals and objectives were met before the next phase begins.

(3)   A prototype of the proposed system should be conducted before large-scale implementation takes place. The suggested prototype would consist of at least two phases. Phase 1 is to continue for the 1993 session with the lab environment, which was in place for the 1991 session. Phase 2 is the use of 12 notebook computers (6 for the House and 6 for the Senate) for the 1995 session. Additional prototypes may be necessary if all goals are not met in the first two phases.

(4)   The Legislature should continue to review and test new technology to determine if it can be applied to automating the activities of legislators. Technology, such as the Apple Newton or the IBM ThinkPad computer, may be a better way of automating the activities of some legislators than the traditional PC.

(5)   The Legislature should hold joint meetings of the House and Senate Legislative Administration Committees to assist with development and design issues and to resolve the policy and organizational issues needed to bring about proper implementation.

(6)   Legislative agencies should work toward defining desirable types of access to legislative and state government data for legislators. This could be a complex task because of the large amount of computerized data state government currently has available, the different formats this data is in, and the varied requests that 150 legislators could generate. Cost and staff availability will limit what can be accomplished in this area. If the Legislature can set priorities in this area, the limited staff and funding can be better applied.

APPENDIX A

HJR 23

HOUSE JOINT RESOLUTION NO. 23

1 INTRODUCED BY LEE, BOHARSKI, COBB, CONNELLY, THOMAS,
2 MERCER, HARPER, DRISCOLL, J. BROWN
3
4
5 A JOINT RESOLUTION OF THE SENATE AND THE HOUSE OF
6 REPRESENTATIVES OF THE STATE OF MONTANA REQUESTING AN
7 INTERIM STUDY BY THE LEGISLATIVE BRANCH COMPUTER SYSTEMS
8 PLANNING COUNCIL TO PLAN FOR PRODUCTIVE USE OF COMPUTERS BY
9 LEGISLATORS.
10
11 WHEREAS, technology has become an increasingly important
12 partner of state agencies in the efficient, economical
13 performance of public duties; and
14 WHEREAS, this trend is bound to continue; and
15 WHEREAS, computer applications in the Legislature have
16 enhanced the speed and accuracy of legislative work to an
17 increasing degree over the past 18 years; and
18 WHEREAS, applications now available through the use of
19 personal computer technology could significantly enhance the
20 ability of Montana legislators to communicate with each
21 other, their constituents, and state government; and
22 WHEREAS, small portable computers with significant power
23 are available that could be provided to legislators to
24 support and improve their legislative work; and
25 WHEREAS, careful planning of potential applications

1 requires consideration of not only the computer equipment
2 that may be involved but also the software, software
3 systems, communication systems, and power requirements that
4 would be needed to serve legislators; and
5 WHEREAS, the Legislature has established the Legislative
6 Branch Computer Systems Planning Council to plan computer
7 applications within the Branch.
8
9 NOW, THEREFORE, BE IT RESOLVED BY THE SENATE AND THE HOUSE
10 OF REPRESENTATIVES OF THE STATE OF MONTANA:
11 That the Legislature request the Legislative Branch
12 Computer Systems Planning Council to conduct an interim
13 study relating to the use of computers by legislators.
14 That the Council involve members of the Legislature in
15 the study, through surveys and other appropriate means, to
16 ascertain the types of applications that members would find
17 useful in their work.
18 That the Council survey the directions taken by other
19 states in providing computer support to their legislators
20 and evaluate the potential for similar applications in
21 Montana.
22 That the Council submit recommendations and options,
23 including budgets, for consideration by the 53rd Legislature
24 to begin implementation by the 54th Legislature.

-End-

APPENDIX B

LEGISLATIVE BRANCH COMPUTER
SYSTEM PLANNING COUNCIL

LEGISLATIVE BRANCH COMPUTER SYSTEM PLANNING COUNCIL

Title 5, chapter 11, part 4
Computer System Planning

5-11-401. Purpose. It is the purpose of this part to establish a mechanism for computer system planning encompassing broad policy needs, long-term direction for computer use, and the effective implementation of a detailed plan for the legislative branch. It is the purpose of the plan to assure coordination of information system decisions so that the overall effectiveness of the senate, the house of representatives, and legislative agencies may be improved. It is the further purpose of the plan to enhance the coordination of legislative branch systems with executive branch systems wherever possible.

5-11-402. Legislative branch computer system planning council. There is a legislative branch computer system planning council composed of:

(1) the secretary of the senate or another representative of the senate designated by the president;

(2) the chief clerk of the house of representatives or another representative of the house designated by the speaker;

(3) the sergeants-at-arms in the two houses or another representative of each house designated by the chairman of the legislative administration committee of that house;

(4) the executive director of the legislative council, who shall chair the planning council;

(5) the legislative auditor;

(6) the legislative fiscal analyst;

(7) the executive director of the environmental quality council;

(8) the consumer counsel; and

(9) a person designated by the director of the department of administration to represent the data processing policy and planning functions of the department, who shall serve as a nonvoting member of the planning council.

5-11-403. Duties of legislative branch computer system planning council.
(1) The legislative branch computer system planning council shall develop and maintain a legislative branch computer system plan. In developing and maintaining this plan, the planning council shall:

(a) continuously review or have reviewed existing information systems that are candidates for automation or enhancement, as well as review existing automated systems that may be improved or integrated with new applications;

(b) develop and maintain a description of functions or services in the legislative branch and its agencies that would, through application or improvement of computer technology, provide better service to members of the legislature, legislative agencies, and the public;

(c) develop and maintain a ranking of needs, taking into consideration the relative effectiveness and probable cost of alternative systems; and

(d) develop and maintain recommended system standards for the legislative branch and standard or custom software and hardware solutions appropriate to the needs and environment of the legislative branch and its agencies.

(2) To the extent possible:

(a) future applications should be explicitly identified in the plan;

(b) current applications should allow a high degree of flexibility so that future applications are not limited; and

(c) both current and future applications should be coordinated and compatible with the standards and goals of the executive branch established under 2-17-501 through 2-17-503, as well as the legislative branch standards developed in accordance with the requirement in subsection (1)(d).

5-11-404. Technical support. The executive director of the legislative council shall provide technical staff support to the legislative branch computer system planning council. In performing this duty, the legislative council staff shall assist the planning council by developing or having developed analyses of existing and alternate systems; providing technical solutions and advice related to the standards set by the planning council; assisting in assessing benefits and costs of optional solutions; apprising the planning council of developments and directions in the industry; maintaining

a liaison with and informing the planning council of plans and directions within the executive branch; assisting in the selection and purchasing of supplies and equipment; and providing other assistance as may be requested. The executive director shall encourage participation of appropriate personnel of the senate, the house of representatives, and other legislative agencies in the provision of technical support.

5-11-405. Legislative branch computer system plan -- adoption. The legislative branch computer system plan must be approved and adopted jointly by the legislative administration committees of the senate and the house of representatives.

5-11-406. Legislative branch systems -- conformity to standards. Computer hardware and software systems installed by the senate, the house of representatives, and legislative branch agencies must conform to standards established in the legislative branch computer system plan in effect at the time the purchasing decision is made.

APPENDIX C

LEGISLATOR SURVEY

Potential for Use of Computers by Legislators
Survey Results

Prepared for
The Legislative Branch Computer Systems Planning Council

by
Robert B. Person
Ex Officio Chairman

September 28, 1992

Introduction

Enclosed is a report summarizing responses to a survey of all 150 Montana Legislators. In all, 98 responses were received. The survey was designed to gauge the current level of familiarity Montana legislators have with computers, to ascertain what applications members would find useful in their legislative work, and what level of support there might be to invest in computers for members.

Procedure

The survey was mailed March 10, 1992 with a stamped envelope included for return. No deadline for return of the survey was included. Data entry was concluded in September, 1992.

A new computer program, Survey Pro, was used to prepare the questionnaires and is being used to evaluate them. The summary enclosed was prepared by the program. The percentage of responses for each choice for those answering the questions are reported.

Results

- Computer use among legislators is fairly widespread. 59% of those responding report they currently use a PC.

- Word processing is by far the most commonly used application and is the application most members responding think would be useful in legislative work.

- Access to data bases -- bill status, bill text, and amendment text -- all rank very high as potentially useful to legislators.

- Less than 1/4 (or, alternately nearly 1/4) of the respondents felt they were not sufficiently familiar with computers to know for sure what would be useful.

- There has been a sense among staff and some legislators that a computer should be available wherever a member needs to work, but clearly members believe the Capitol is the most important place. (This question may have been flawed in that it seems some members thought they only had one choice.)

- While 8% of the legislators responding said they would be unwilling to attend presession training on computers, over half (56%) responded they would be willing to train for up to 5 days.

- Clearly, there is broad based concern that any system proposed be cost effective. Opinion ranges widely between those who are eager to have access to a broad range of services soon and those who are totally opposed to any development. The ability to save paper was a recurring theme.

Question 10 of the survey was an open ended request for written comments. The computer program prints these out with an ellipsis between comments from different forms. For example, if you look at the beginning of the answers on page 3, the first form on which there was a written response contained only "Thanks." The ellipsis following that shows the break to the next comment. The comments are gathered in the order they were entered on the computer.

Conclusion

Clearly, communication is the principal way legislators would use computers. 74% of those responding believed word processing would be the most valuable application. The following three applications provide access to data bases used in the legislative process: bill status, bill text, and amendment text. A minority indicated other applications would be useful.

Of the data bases that legislators would find useful, only bill status is currently designed for broad access. A clear message from the survey is a need to design modifications in the data bases used by staff to support legislator access.

ppe 2274rpxa.

House Joint Resolution No. 23 Survey
Potential for Use of Computers by Legislators
Survey Response Summary

SUMMARY OF ALL 98 FORMS

(1)   Do you personally use a personal computer in your home or office?

59.4% Yes   40.6% No
For 96 replies.

(If your answer to question 1 was "No", please go to question 6.)

(2)   What types of application programs do you personally use?

92.9% Word processing   30.4% Communications   19.6% Other
62.5% Data base   (modem, fax board,
58.9% Spreadsheet   etc.)
For 56 replies. More than one answer accepted.

Other replies: Music, art, video, compilers ... Graphics ... File Maker plus ... GIS; other
scientific applications ... Book keeping ... Business accounting ... Accounting, calendar,
mortgage calculator, etc. ... Client files ... Financial ... Calculations ... Accounting, marketing

(3)   If you use communications applications, please indicate whether you use:

50.0% Public access electronic mail (MCI,   35.0% State of Montana Bulletin Board
       GEnie, etc.)   20.0% Other
45.0% Intraoffice electronic mail
For 20 replies. More than one answer accepted.

Other replies: [2] Not specified ... Edunet; MetNet ... F.A.A. weather -- local bulletin boards

(4)   If you use data base applications, do you use:

60.5% Data bases developed yourself   7.9% A CD-ROM data base (MCA,
47.4% Company (business/organization) data   electronic encyclopedia, etc.)
       base developed by someone else   2.6% Other

For 38 replies. More than one answer accepted.

Other replies: WestLaw; Lexis

(5) Were the Legislature to provide a computer and software for you to use for legislative work, would you be willing to use different software programs than you currently use (for example: WordPerfect vs. WordStar or Lotus 1-2-3 vs. Quattro)?

92.7% Yes   7.3% No
For 55 replies.

(6) Whether or not you currently use a personal computer at home or at work, which applications would be valuable to you in your legislative work?

73.7% Word processing (to draft letters, bill proposals, speeches, etc.)
68.4% Access to the Bill Status Data Base
65.3% Access to a bill text data base (read bill text on screen)
64.2% Access to the text of proposed amendments
52.6% Access to the State Bulletin Board (Messages from constituents; agencies)
48.4% Personalized data base access (constituent tracking, etc.)
For 95 replies. More than one answer accepted.

45.3% Electronic mail with Legislative Staff
45.3% Electronic mail with other legislators
44.2% Electronic mail with Executive Agency Staff
38.9% Spreadsheet (to do financial analysis, budget work, etc.)
23.2% I am not sufficiently familiar with computers to know for sure
4.2% Other

Other replies: modem and fax capabilities ... NRIS or other agency data bases ... Preparation of fact sheets ... Access to all public records that are available for public access

(7) If I began to rely on a computer for the functions I listed above, I would want to be able to use it:

54.2% In a Capitol office assigned to me (if any)
49.4% On the floor of the Senate or House
39.8% At my home or office in my district (throughout my term)
For 83 replies. More than one answer accepted.

37.3% A shared pool of machines in the Capitol is sufficient
16.9% Where I stay in Helena during session

(8) Would you vote for a budget to provide computers, software, and computer staff support to legislators?

47.2% Yes, any reasonable cost
20.2% No
18.0% Other
10.1% Yes, limit $3,000 per legislator
For 89 replies.

3.4% Yes, limit $5,000 per legislator
1.1% Yes, limit $10,000 per legislator

Other replies: not specified ... 50/50 matching program with personal payment by legislator ... Yes, it depends on the total cost, etc. ... Only if they agreed to a training period ... If it could be proved cost is less or same as now ... See comment ... Yes -- only after being convinced of a cost saving ... Would have to evaluate with all other budget needs ... I would have to see cost savings first ... Depend on use -- not to support incumbency -- must be phased in ... Would have to consider what the budget would support ... A few shared machines limited to $3,000 each set-up

... Examine costs carefully ... Cost based on shared computers at less than $1,000 a member. ...
The investment will be repaid many times over. ... Depending on cost

(9) Were you provided with a computer for legislative use, would you participate in presession training for legislators in how to use it?

56.2% Yes, up to 5 days maximum   7.9% No
36.0% Yes, for 1 day maximum
For 89 replies.

(10) Do you have any comments or recommendations that you want the Legislative Branch Computer Systems Planning Council to consider in preparing its recommendations? (This is an essay question for 20 bonus points!)

Thanks ...
I appreciated access to the 3 computers last session -- and printer. Access to bill text data base would be wonderful, as would access to amendments.
...
Personal computers are a "fact of life" for our society. The potential for time and labor savings is practically unlimited. However, it would do little good just to purchase a computer for each legislator. The end result would be a catastrophe like the one in the Department of Revenue where PC's sat idle for over two years. In my opinion, it would be too costly to purchase a computer for each legislator, so some sort of pool would be necesary. The pool would have to be in some well-lighted, private area -- not in the hallway to the bathrooms.
...
Look at small portables that could sit on legislative desks on the floor, and that we could take to an office or home. Cost of these is around $2,500 for a Texas Instruments 386SX with 60 meg of memory . . . getting down there in price.
...
Information is the most important aspect as a legislator. Any means to improve our method of obtaining accurate information would be very valuable.
... We can't afford this kind of convenience. With the fiscal condition of the state, I find this type of expenditure inappropriate. ... Frankly, I think computers are a temporary fad and when people come to their senses, they will go the way of the widget and the buggy whip. ... We have sufficient computer access -- the 3 or 4 next to the House Sergeant's office were always vacant -- any additional would be a total waste that I'll personally expose to the Tribune. ...
What would be the savings in printing costs and time-wasting for amendments, conference committee reports, etc. What about experience in other states?

Not sure constituent tracking, etc would be appropriate.
...
I believe it is critical that legislators who are willing to use computers have access to them.

I believe pre-session training should start to at least allow us to better utilize what equipment is available. Once the session starts, some of us don't have time to be trained.
... I don't have any personal computer experience, but they touch my life every day and especially during the campaign and the House sessions. ... I think it is very essential that legislators have access to computers. It is time we catch up to the 90's! -- 20 + ? ... Cost vs. benefit to me and constituents would have to be evaluated. ... I'm pleased that you are working

so hard on this! I've been talking about it for years. There could be substantial savings on paper and printing. I'd use a computer for all copies of bills, etc. on house floor. You could also eliminate "chapter law" books, house and senate journals and final status books, etc., etc., perhaps even M.C.A. Thanks for your efforts and Good Luck! ... I would hope you might be able to prove the cost effectiveness by factoring in the paper work etc. done by others. I am especially interested in recycling and wonder if this would cut down on number of papers? ... My support of HJR 23 was based on use of a computer screen system for use on the House or Senate floor to track bills, to review bills, to review amendments as presented and how they fit into a bill. It was not, and is not, to provide each legislator with a personal computer to use off the floor or at home. We could save many thousands of dollars in paper purchases with a system like this and it would be less costly than providing a regular personal computer for everyone. Remember --"Moderation in all things, including excesses." What I visualize is sort of an enhanced version of the Bill Status System that we are using now. Surely that will lower costs and reduce the amount of training needed. It will also provide us with what we NEED and not with what we would like. ... Although I don't currently use a computer, I realize that most people do and that it is important for data management. I could probably learn -- by the time we find the money to get all the equipment! ... I believe this would be an unnecessary expenditure of tax dollars. I can see no reason how computers for legislators will improve legislation. For a 90-day session every other year this is realistic? -- hardly. ...

I would not necessarily oppose [an appropriation] but would have to have a lot of information before I approved a large expenditure of tax dollars. To state that you would limit expenditure to a certain amount without any figures on cost of purchase and operational costs would not be a responsible position to assume.

It is said you can't teach an old dog new tricks. I guess I fall into that class. I just don't care to spend what time I have on learning a whole new concept.
...

Though I do not use a computer now, I would be interested in having the legislature make use of them if it would cut down on the enormous amount of paper used each session plus make for more efficiency.

I have reservations, however, as I have observed government offices such as ASCS which have gone to computers and it seems like there is more paper wasted than before with no reduction in office help.
...

Prepare House and Senate rule change proposals and law change proposals to eliminate the avalanche of paper, including agency reports to the legislature.

We'll need lots of printers -- laser.
...

I also need access to a computer for my aide (aides). I need access at night and on holidays. A computer in my office should be sufficient. I shared one with a committee secretary in the 1991 session, but it is not entirely satisfactory.

I am becoming very dependent on a computer. I have one in my office and at home both.
... Am in the market to purchase a computer presently. ...

In my two terms, I have brought my own PC on which I have WordPerfect. In Jan. '92 special session I used a laptop with WordPerfect.

Beyond correspondence with constituents, I don't believe computers are practical as we would have to hire secretaries to run them for us. With the press of business in those 90 days, I don't see any time to become familiar.
...
I believe before we put any money into computers we should set up an incoming WATTS line for legislators. It seems criminal to me to ask members to give time, money, etc. and also to pay for incoming calls. If a member is active in the interim period, there is a big need to stay in touch with the various departments of government.

We need to provide some office space during the session for all legislators. Not fancy but workable in shared area such as the area Speaker Harper allowed the minority party to use in 1991.

I would not support the purchase of computers for each legislator until we have addressed the two problems I have listed.
... We can't afford the additional expense. We don't need to generate a greater volume of paper. ...
Perhaps a phase-in would be most cost efficient. In our offices, folks had to bid for computers (PC) on their desks. Those that showed the greatest use potential received first priority, etc.

I would bring (did bring) my own PC but would really like to be able to tie into state network. If you could establish standards for self-owned PC to be linked, we could gradually upgrade.
...
Mainly how much could be saved in man hours and materials if computers were used to replace individual printing of bills, amendments, and other legislative materials?

How much would it cost to have terminals at each legislative seat?
...
Communicating with committee members during interim would make it possible to avoid some travel -- to be able to carry on a multi-way meeting via computer could save money -- like conference calls.

Accessing experts from outside Montana is a potential use.
... I do not think we should pursue this extensively until we clear up the present budget deficit in the state. ... Provide every legislator with a lap top (286 or 386) with a system access at their desk and office if they have one. Allow access to bills, amendments, votes, journals, rules, staff and agency analysis, etc. ... Computerizing as suggested by these questions will be feasible when state government's current budget crises have ended -- or, as it appears now, roughly when the sun burns out and it has been duly certified that hell has frozen over. ... The taxpayers of Montana can not afford a computer system for legislators ...
The first use of the computer is for legislators to do their work, not get reelected. I realize constituent work is important but we would abuse the computer more for getting reelected than for committee and floor work. Limit use of computer and phase in over time more things we can do with it.

For me I would like access to more budget work. Look at more detail levels of budgets than I can do now without overusing overworked staff. Also review minutes of bills of past years would help to understand similar present session bills.

... I would have to see estimates of set-up costs and future expenses before I could decide whether I would support [a budget for computers]. I would find this service very useful but suspect there is not a majority of legislators who are willing to pay the cost of moving in this direction. ... I feel computer training would be beneficial for most legislators. ... Do what's right! ...

If we increase computer use in the Capitol, we would have to be sure there is adequate power and what the cost would be for that.

I think computer services are very necessary but when we are facing the budget constraints we will surely see in 1993, I think it would be difficult to think we might be able to fund it.
...

On every budget that comes before my committee, the use, upgrading, expanding of the computer system is forcing the budget up and up. Computers are here to stay; however, we lose some personalized service. For each legislator, I'd say the cost does not warrant the purchase and time use. Those legislators who really use computers already have them -- but I'd take the class training if we get them.

Here's what I've noticed: a department or bureau will say they can do so much more work with a P.C. -- Then they say, we need more FTE's to use the computer. If we had less time and money, we could prioritize the work and only do that which is of highest priority.
...

A beginning step could be a shared pool of machines in the Capitol.

I usually bring my home computer to Helena and set it up where I stay so I'd prefer the equipment to be at the Capitol but able to interface with my home system.
...

Keep this effort going. There will be twice as much computer usage by legislators in '93 as in '91 and by '95, everyone will be addicted!

I want to be able to use my own 386 machine

... Please figure out how much paper you can save by shifting to electronic transmission. Promise to cut down on the paper flood and I'll follow you anywhere. ... I believe this will cost more than the state can afford at this time. Knowing how government works, I'm sure only IBM or some other just as expensive computers would be chosen. Much could be saved by having someone build these computers and copying the programs needed for each computer rather than having a pile of separate programs. ... It would be very helpful if the L.C. could provide copies on diskettes of bills, statutes, or amendments to legislators who have home computers. (This assumes the home computer uses WordPerfect 5.1.) For example, in preparing for next session, I might like a copy on diskette of a bill from last session that I can tinker with on my computer. Also, although I don't have a CD-ROM player, it would be helpful to have the entire code available in diskette form, or, more likely, on a CD. ... Let's work our way into this slowly -- 1 computer, say, for 5 legislators to start -- evaluate costs, usage, etc. then proceed. Every legislator does not need (nor would he or she use) his or her own computer to start with. ... Please advise us after you have cost estimates ... I would resist expansion of this to include constituent data base such as a voter data base. This could be used or expanded for political use.

...
I think the legislative system would have to be compatible with other state computer systems.
I'm learning to use a computer, so this would be a big help to me.

...
See no need for each legislator to have persoal computer at their disposal.

...
Security for electronic mail is imperative -- very strong security. Adequate training for
legislators and an assistant. Adequate support (technical support) after training. Novice users
will require quite a bit of technical support even with 5 days of training to build their skills and
expand the effectiveness and use of the system. Making the bills available electronically to
counties could represent an enormous savings in paper, printing, and shipping. The electronic
transfer of files between legislators and committee members could save many hours of labor as
they could be revised in their word processing software and sent back electronically saving many
hours of retyping etc. This is worth an ample investment!! The benefits will be received and
value recovered many times over!
... No ...
It's time to begin entering the 20th Century (just as we start heading into the 21st). A tool is a
tool. We need to use the proper tools.
... User friendly software offering WYSIWYG, portability, and modem interface allowing use at
home, in Helena apartment, and at desk at legislature. Why not have committee of legislators
with most computer use experience participate in planning. P.S. get Jack Ramirez to send you
some ideas. When in leadership he made extensive use of computer. ... Cost ... I could save a
lot in paper long term -- not everything would have to be printed. ... I envision a session that
would have substantially less paper floating around. The trade-offs in reduced paper cost and
confusion costs might go a long ways toward paying for computers for legislators.

APPENDIX D

LEGISLATIVE AUTOMATION IN OTHER STATES

TRENDS IN LEGISLATIVE AUTOMATION

By Steve Graff

National Conference of State Legislatures

March 1992

- Legislatures are becoming more involved in the planning, implementation, and oversight of state telecommunications networks. These networks play a critical role in managing a state's information resources. The most striking example is in Alaska where the state maintains a large communications network with the use of satellite technology. Other states are examining providing incentives to operating companies to upgrade their systems with fiber optic cable and digital switching.

TRENDS IN LEGISLATIVE COMPUTERIZATION

The major trend in legislative automation is, quite simply, more. This trend merely reflects the demands on legislatures to handle more information, more requests, introduce and consider more bills, and do more with less. As a consequence, demands on legislative computer staff have increased to provide more computer resources, develop and support more applications, and provide better integration of information resources. Fortunately, the rapid pace of technological developments has assisted staff in meeting these demands. Below are listed a number of developments and applications that I believe point the way to the future of legislative automation. I have intentionally avoided discussions of particular computers in this discussion. Most of the examples below can be performed on anything from PCs to mainframes. It is best to focus applications and then select the most appropriately scaled and priced compatible system.

- A universal trend in the use of computers is in what users see when they use them and how they enter commands and information into them. Graphical user interfaces (GUIs, pronounced Gooeys) are becoming the standard. Examples of this type of interface include Windows, the MacIntosh interface, and host of other window type interfaces available from many manufacturers. GUIs offer consistency in the way different applications operate and offer superior integration between applications. GUIs have been shown to significantly improve worker productivity and decrease training requirements.

  New methods for interacting with computers are emerging. Voice recognition holds particular promise in the legislative environment. Voice commands are issued to the computer to perform the appropriate commands. No manual input is required. This technology has been slow to emerge owing to the incredible variations in human speech. However, some of the first products should be on the market soon. Another potentially promising device is the "pencil and slate". This device allows hand written information to be stored in the computer. Here again, there are some significant developmental problems to overcome in translating writing to text. Touch screen technology has been with us for some time and is being used in some legislatures. Expanded use of touch screens can be expected for some applications.

- Some of the most interesting developments in this area are occurring at the level of the legislator's office. The New Jersey Legislature, the California Assembly, and the Florida Legislature have automated the district offices of members. The nature and extent of this automation has been directed by those legislative bodies. In addition to the typical applications necessary to support district office requirements, the projects permit access to the central legislative systems and the applications residing on them. The use of high speed network links permits staff in the district offices to communicate with the members and staff in the capitol through the use of electronic mail. E-Mail is used to provide constituents with information that previously had only been available by contacting offices in the capitol. This can include copies of bills, bill status information, and almost instantaneous response to constituent requests and inquiries. Of course, legislators in many states have automated their offices individually. However, institutional commitment to district office automation allows greater functionality and integration of all of the information resources of the legislature.

TRENDS IN LEGISLATIVE AUTOMATION

There are three major factors that are driving application development and the demand for greater access to information resources in legislative environments. They are: (1) the desire for large volumes of current information, (2) the need to integrate, analyze, and disseminate this information, and (3) the desire to improve the efficiency of particular tasks involved in the legislative process. The demand for each of these continues to swell. Typically, when information technology in the legislature is discussed computers are the first thing to come to mind. However, this view overlooks the most used and familiar piece of information technology in legislatures--the telephone.

TRENDS IN TELECOMMUNICATIONS SERVICES

- The use of the advanced features of modern Private Branch Exchanges (PBXs) can be expected to undergo dramatic growth. In particular, voice mail, phone forwarding (even to home or portable phones), and the use of automated attendants (pre-recorded messages instructing the caller to route calls) can prove very valuable. In addition, PBXs are used as nodes for accessing WATS or long distance services from remote locations. This permits members and staff to dial into the PBX and connect to long distance services through it. The advantage of this approach is to unify billing and to take advantage of volume discounts offered by long distance carriers.

- The use of portable phones by legislators will become increasingly common.

- The growth of and demand for fax services will increase. Major growth in the portable fax market, either in the form of portable fax machines or fax boards in portable computers is anticipated.

- The advent of high speed, very broadband telecommunications services permits simultaneous transmission of voice, data, and video. Applications such as two-way interactive video, the transfer of very large data files, and multi-media applications (combined video, computer images, and sound) can be supported over long distances with this technology. It will soon be possible for legislators to hold hearings throughout the state and attend distant meetings without the need to leave the capitol or their district office. This technology is already being used for remote preliminary hearings in some cities. As more customer premises are wired with fiber optic cable, it should be possible for them to testify to committees from their homes. Of course, this will also permit legislators to respond "in person" to constituents. The barriers to this technology at present are cost and the fact that the telecommunications network is not sufficiently developed to handle these applications.

- Increasing integration of phone and computer systems is emerging as the widespread networking of computers becomes an instrumental aspect of managing information. PBXs now routinely handle simultaneous voice and data traffic. A rudimentary example of this integration is the ability to place calls directly from a PC by specifying or selecting the person to call. The PC handles dialing the phone directly from information stored on it. Another example is the use of computers to do selective broadcast calling or faxing to particular groups selected from a computer data base.

- A new concept under development is a personal telecommunications number. It involves assigning a number to each telephone consumer so that calls would be placed to this number rather than a particular telephone. It requires the user to notify the central telephone system of where they may be reached by punching their number into a phone where they are located. Calls to their personal number then would be automatically routed to that telephone number. Combined with portable phone technology this would permit people to be reached anytime, anywhere. It is a rather intriguing technology that should start becoming available within five years.

- An application that is receiving a great deal of attention is constituent support software. This software permits legislators and staff to very effectively manage constituent requests and contacts. These systems permit the tracking of requests and contacts, assist in generating correspondence, and can provide information on constituent opinion. The data base functions provide by these systems are their most powerful feature. Loading information on all the registered voters within a member's district provides an "instant" data base that can be updated, annotated, and modified. This allows legislators or staff to call-up the records of constituents either individually or by group according to any number of criteria. Information from the records is used to generate and labels, correspondence, and tailored lists. In addition, the systems are employed to track requests and problems by generating lists categorized by type and status. The Washington Legislature and the California Assembly support these systems for their members. Individual member's offices, caucuses, and political parties also make extensive use of these systems. The capabilities of the software has created some concern and debate over potential abuses of them. In particular, their abilities to do mass mailings and electioneering have been the objects of debate. The California Assembly has crafted a series of rules and policies to address these concerns. Attached is a list of vendors of these products.

- One of the most notable new legislative applications is chamber automation. The chamber automation of the Michigan Senate has received a great deal of press. Each senator, upon request, has a workstation installed at their desk on the floor. The workstations are networked to allow communication between them and with other information resources outside of the chamber. The units are installed in a specially designed sideboard attached to their desks. The use of flat panels (like on a portable computer) as displays makes the systems almost completely unobtrusive. The chamber's voting system is completely integrated with the network. Information on votes and the current amendment under consideration can be displayed on the screen. Touch panel technology permits voting and changing the display of information without the need to use a mouse or keyboard. The system also permits members to communicate with other members on the floor either through "canned" messages or by using the keyboard to compose a message. These messages can also be broadcast to groups of members by simply selecting their names from a list that appears on the screen. In addition, members can communicate with and use the applications that are available on the systems in their offices. Having seen this system, I can attest that it is remarkable. Enclosed is some documentation on the system.

- A number of members and legislative staff have recently expressed interest in committee room automation. To date, I am only aware of one state that has implemented it. The Joint Budget Committee in Idaho has developed a system that displays information on the items under consideration. There are two screens displayed for each item--a spreadsheet of the budget figures and the text of the bill. Members can select between these displays through a switch at their display. For members it is a display only system with two members sharing a slave display. The display of information is controlled by the chair who directs staff members as to what should appear on the display. Members have no means of interacting with the display or the material displayed on it. All interaction with the information displayed on the screens is performed by staff. The limited ability of members to control the information is viewed by many as a major limitation of the system. Others have envisioned committee room automation as being tightly integrated with the central legislative systems. In this scenario the text of bills would be displayed, and, as actions occurred, the bill status system would be updated and the text of bills would be modified to reflect amendments. In addition, some have suggested that the system should allow members to access all of the research associated with a bill. Within the next several years, we should see major developments in this area.

- Legislators are expected to make important policy and budgetary decisions on subjects that are often extremely complex. Marshalling and summarizing all of the information that bears upon a particular action can be exceedingly difficult. Yet, often the same information is needed year in and year out. Specialized programs generically termed executive information systems (EISs) or decision support systems (DSSs) can be employed to collect and summarize

information of this nature. The legislatures in Kentucky and North Carolina have implemented EIS-like systems for analyzing the budgets and expenditures of executive agencies. The systems actually tap into and pull down data residing on the computers of executive departments. The data are then typically summarized, analyzed, and formatted according to the needs of members. A particularly useful feature of these systems lie in their ability to produce exception reports--that is flag transactions or spending patterns that deviate from what would normally be expected. Such systems can greatly assist legislators in their responsibilities concerning budgeting and oversight. Judging by the extremely positive reactions I have seen to presentations on these systems by staff and legislators I believe that they will become indispensable tools for legislatures in the near future. Enclosed is a description of the BEMOS system used in North Carolina.

EIS and DSS systems can also be used with other types of data to assist in effective management. For instance, they can be employed by the leadership of legislatures to track bill and committee activity to aid in legislative management.

• Popular word processing systems are beginning to replace specialized bill drafting programs. Word Perfect is used by at least three states--Indiana, the Michigan Senate, and Washington--for performing almost all of their bill drafting. The expanded capabilities of the new generation of text processing programs allow the insertion of graphics, boilerplate, and sophisticated programming capabilities for formatting of documents. Industry analysts believe that these products will soon incorporate sophisticated page layout and typesetting capabilities. Such features would permit them to be used for all aspects of bill drafting and production.

Several particularly attractive aspects of using standard word processors include: (1) it is relatively easy to hire temporary staff with knowledge of the product, (2) they are used on PCs permitting drafting to be performed without the need to be connected to the legislative mainframe, and (3) support from the vendor is typically more easily obtained. The major drawbacks involve the requirement to integrate them with bill status and statutory retrieval systems.

• Major changes are being made in the way legislatures are producing their printed materials. Several legislatures are now doing their own computerized typesetting and, in some cases, printing work. By so doing, major cost savings have been realized and turn around time has been markedly reduced. The next major advance in this area will be the introduction of demand printing. Demand printing precludes the need to print many copies of a document a number of which will never be requested. It permits printing fewer copies of documents initially because additional copies can be printed as required by calling it up on a computer and requesting it be printed. California and Washington have done quite a bit of work in the typesetting and printing areas.

• Training legislative staff to fully realize the potential of the information systems at their disposal is becoming a daunting task. The veritable explosion of applications and the frequent upgrades of computer software make staying current with all of the applications and their features difficult even for computer staff. Most legislatures rely on their central DP staff for training and support. Some have instituted help desks that are staffed throughout the day by computer personnel. Others simply rely on calls to the computer center which are routed to the person most familiar with the program.

A technique that has shown promise is requiring an orientation or training session for each legislator or staff member before they are authorized to use a particular system or program. Some computer center directors have found that this strategy has markedly reduced demands for assistance. However, this requirement must be fully supported and, in fact, initiated, by legislative leadership to be successful.

Several legislatures are relying on the use of external trainers to train users in PC applications. Typically, colleges, universities, or private concerns are contracted with to provide these services for a relatively low per capita cost. Others are using specialized training facilities built exclusively for legislative use. Some have gone so far as to hire specialized training staff for member and staff training.

- A critical issue facing legislatures involves assuring that the public has access to the process and is kept informed of developments in the legislatures. Computer technology is being used to help deal with this issue. From the production of newsletters to providing public access to bill status and electronic mail systems computers are being used to facilitate communication between legislatures and the public. The Wisconsin legislature recently instituted a public access system that allows people to leave and receive messages via electronic mail and make inquiries about bill status. People that wish to access the system need a PC and a modem. There are plans to make public access terminals available in libraries and county courthouses so everyone in the state can have access to the system. The North Carolina General Assembly has a voice synthesized integrated with its bill status system so that the status of a bill can be obtained via a touch tone phone. The voice synthesizers "reads" the information about a bill directly from the bill status data base. Anyone accessing the system merely needs to know the bill number. Other states permit access to their bill status systems on a subscription basis.

- Advances in data base management systems are certain to have an important impact on information management in legislatures in the very near future. Full text data base systems that allow integration of sophisticated graphics and video images are now available. Coupled with optical scanning and storage technologies these systems may well revolutionize how we access and process information. It will become routine to call up a bill or piece of research and have an image consisting of text, pictures and graphics, and full motion video complete with sound appear on the display. Thus the text of a bill, graphs of its fiscal impact, constituent comments in text or video form, and committee and floor debate in video would be available for display. Multi-media presentations may also become an important means for legislators to communicate with constituents and media outlets. Complete presentations on particular issues could be distributed on optical disk or downloaded to distant computers. Media outlets could then create clips from these for news pieces. Constituents could receive detailed information on just what the legislature is doing about issues of major concern.

  At a more practical and immediate level, this new generation of data base packages can be used to facilitate production and information retrieval. Many of these systems will now store files in their "native" (e.g., Word Perfect, Lotus etc.) format and yet be displayed as normal text. This feature permits very rapid loading of data bases and retrieval of documents complete with all formatting. Typically, documents must be converted for loading into data bases and reformatted upon retrieval. Thus, a very time consuming step is eliminated. Washington and Indiana have recently installed a data base package with some of these features. Strong growth in this area is expected with the coming release of multi-media products from major vendors.

- Color will become *de rigueur*. The use of color can convey information more effectively and make the information more interesting. Color computer displays are rapidly becoming the standard. The cost of color printing and reproduction is rapidly decreasing. Hopefully, within five years it will become truly affordable and cost effective.

- Geographic information systems (GISs) will become an important analytical tool. Many legislatures are currently using these systems for the first time for redistricting purposes. GISs will be used to display demographic, economic, infrastructural, revenue, resource, and environmental information in a readily understood manner. Similarly, they will be employed in graphically demonstrating the impact, particularly fiscal, of legislation.

- Legislatures will become more involved in the oversight of state government computer

operations as the value of states' information resources and the potential for significant cost savings is fully appreciated. Legislatures will begin to demand full integration of state government information resources to assist them in their policy making and oversight functions. The commercial value of these resources will also be realized and policies will be established for the sale of this information to vendors for resale. Representative Kay Brown (AK) has recently introduced just this sort of legislation.

The integration of licensing, revenue, child support, and welfare systems will save states millions of dollars by helping to eliminate fraud and non-payment. Limited projects of this nature are in place and are proving very cost effective. In addition, integration can significantly enhance the quality of service rendered to members of the public. As a result, legislatures will become much more involved in setting policy in these areas.

Legislatures will become closely involved to offer "one-stop" service centers for the public. One-stop centers will allow members of the public to take care of almost an business involving a state agency at one location. Computer technology will make this possible by tapping into integrated state information systems. This will prove to be a boon for new residents and new business concerns. It is conceivable that legislative district offices would be part of this network.

Legislatures are also becoming quite involved in establishing standards for categories of information and the format of data. Establishing a standardized accounting system for executive agencies allows legislatures to compare similar categories of expenditures between departments permitting more accurate evaluations of budget requests and expenditure patterns. Setting standards for data formats can help reduce redundancy of effort in state government and permit the more efficient flow of information between agencies. Legislatures in some states are establishing state coordinating agencies to establish and enforce these standards. In Mississippi, the legislature created a statewide GIS coordinating agency that reviews all requests for funds for GIS projects. Simply by eliminating redundant projects they have saved the state significant sums of money. It is not uncommon for different agencies to collect the same or very similar data. By simply coordinating these efforts states could save millions of dollars a year.

- Legislatures will mandate the development and use of artificial intelligence systems by state executive agencies. These systems, sometimes also referred to as expert systems, can provide can expedite typical transactions and make optimal use of local, state, and federal resources. The UNISYS corporation recently developed such a system for the Department of Welfare in Pennsylvania to provide benefits in the most efficient manner possible. Given the large number of programs available to recipients and the widely varying requirements of each it was difficult, if not impossible, for individual caseworkers to ascertain the most appropriate benefit and program mix. The UNISYS system determines the best solution directly from the information on the initial application. The system assures that all federal resources are used to the fullest extent possible in providing aid. By so doing, the state is expected to save millions of dollars a year.

The potential of these systems has yet to be scratched in state government applications. Tremendous growth can be anticipated, particularly in the areas of benefits and purchasing.

Unused Power:
Legislators Ignore Technology

A computer consultant and speaker pro tem, the author takes legislators to task for lagging far behind the other branches, and business, in taking advantage of information technology.

Rick Krueger

Legislators usually want to lead the parade. But right now there is an important parade going by that hasn't caught their attention.

It's the parade of information technology, the electronic medium used in offices and homes to improve the way we conduct our affairs. In legislatures we see it in the form of computers, telephones, televisions, fax machines, pagers and modems. Even a casual observer sees the benefits of passing information this way. You hear the words around the Capitol—*LANS, networks, bandwidth*—so you know these new technologies are being used. But despite the pervasive manner in which they are changing the world, information technologies don't seem to interest legislators beyond certain narrow applications.

High-tech information systems have caught the attention of the other branches of government and of decision makers in the business world who use them to great advantage. These new technologies increase productivity (through innovations such as E-mail and word processing) and improve the quality of decisions (with the help of "decision support systems" and artificial intelligence).

State and local executive branch agencies have high-tech ways to deliver services to citizens. In Tulare County,

Rick Krueger is the speaker pro tem of the Minnesota House of Representatives.

Calif., families can pre-qualify for AFDC grants through terminals set up in public places. Food stamps and welfare payments are being issued through magnetic-stripe cards and automatic teller machines in pilot projects in Mary-

land, Pennsylvania, New Mexico, Minnesota and Iowa. Ohio, South Carolina and other states are developing similar projects. In Mercer County, N. J., citizens vote with just a touch to the screen of a personal computer that automatically tabulates the results of every race as soon as the polls close. The Minnesota Department of Transportation uses artificial intelligence to help truckers legally navigate the state's roads and highways. Truckers calling in on a

touch-tone phone get weight permits and route information via computer.

Governors have at their fingertips computer technology that monitors, analyzes and projects budget scenarios. Reports that used to take hours to assemble now can be created and displayed—complete with graphics—in a matter of minutes or even seconds. Executive branch decision makers can now examine myriad variables of the budget in a manageable format. John Sununu, while governor of New Hampshire, used a "decision support system" to assist him in making budget decisions.

The judicial branch has equally ambitious high-tech systems that schedule judges and track cases. Time-saving arraignment hearings are held via interactive television without moving prisoners. These TV hearings allow judges, defendants, attorneys and other interested parties to see and talk with one another from separate locations. Judges are also experimenting with the use of artificial intelligence to assist in sentencing. This promises a more consistent and fairer system than relying exclusively on a judge's discretion.

Although the new technology offers many opportunities to improve the workings of the legislative branch, little is going on. Legislators could have at their fingertips original information—such as revenue data, agency expenditure data and census data—to examine and manipulate for more complete critical analysis and oversight. They could directly monitor the expenditures of state agencies and know how money is really being spent instead of depending on "packaged" information issued by the agency itself. They could use E-mail and have verification that their messages were received. They could use constituent tracking systems to provide more timely and better ser-

vices to the citizens in their districts. The new information technology could give them a direct link between their homes and the capitol at any time of the day. It could also bring more people into capitol committee rooms to testify via interactive television.

This is not to say legislators aren't aware of the advances—after all, they approve policies and budgets for technology in the other two branches. They create programs to encourage and accelerate high-tech in the business community. And they have approved sophisticated high-tech information systems to support legislative staff. The services delivered by revisers, researchers and clerks are often supported by the advanced use of information technologies.

Unfortunately, many of these systems were designed to meet the needs of staff or the staff's perception of what legislators want. Even in legislatures with a sophisticated level of technology, lawmakers are inclined to make use of only electronic calendars, E-mail, bill status and word processing. And much of what's offered has come from staff initiatives, not legislator requests. In extreme cases where legislative information systems have been implemented to reflect only staff needs, the systems tend to be too complicated for most members to use only occasionally.

Lawmakers are often not directly involved in making important policy decisions about information technology for the legislature. They ought to be. Only legislators know the policy considerations that need to be taken into account when technology systems are designed for their chambers. When lawmakers aren't involved they lose strategic opportunities to have systems that do what they need them to do. Without guidance, technical staff members opt for improvements that in essence add either speed or efficiency to the same method of doing things. Legislators who fail to become involved may soon discover that their chambers and offices have been computerized, but not much to their benefit.

In 1976, before many of the high-tech possibilities of today existed, John Worthley, a researcher at the State University of New York at Albany, predicted in a book he edited on legislative information systems that legislatures would lose out to the executive branch

if they failed to computerize their branch of government. Today, many political observers claim that legislatures have definitely lost power to the executive branch. Jerry Mechling, director of the Strategic Computing Center at Harvard's Kennedy School of Government, says legislatures have fallen behind in taking advantage of new technologies that could assist them in using information to their benefit. "And this certainly has implications for the legislative branch in regard to overseeing executive branch agencies," he says.

Legislators are losing out because they are not paying enough attention to the possibilities in information technology. Legislatures are being computerized,

Legislatures are being computerized, but too often it's merely to do electronically what is currently being done manually.
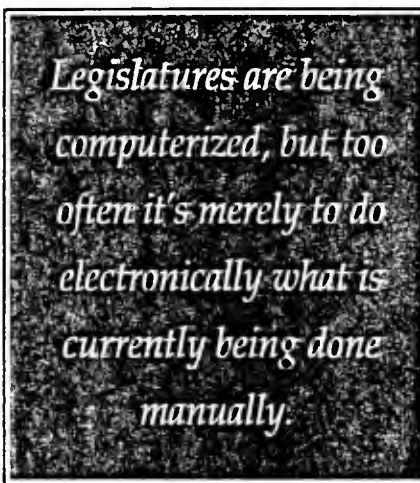
but too often it's merely to do electronically what is currently being done manually. Instead, lawmakers should be asking for the electronic tools that can help them make better policy decisions.

All over the country legislators have been restoring their chambers and returning to the past aesthetically. Unfortunately, few are paying the same kind of attention to current and future technology needs. This may not be for long, however. Redistricting has brought home to many legislatures the power of high-tech information. Now they know that data can be changed from rows and columns into original maps with visual displays. They know that by displaying data more graphically, characteristics that could have been missed are suddenly revealed.

The high turnover rates in legislatures over the past decade may also bring high-tech to the institution. New members are more apt to be experienced in using information technology. As they gain seniority and power, they will

most certainly demand improvements in these services.

Even more legislators will warm up to information technology when prices drop and systems become easier to use. When lawmakers can access information from computer databases by their voice and touchscreen rather than the keyboard, their interest will increase.

Glenn Newkirk, director of automation in the North Carolina Legislature, predicts that "in many instances, legislators will soon bypass staff and get information directly from databases." He attributes this to the fundamental need of legislators to communicate with constituents, which is not a concern of legislative central staff.

High-tech legislators may also bring problems to the legislature. Some executive branch agencies and governors will try to keep the legislature from having direct access to the information managed by the executive branch. Constitutional battles could ensue on the basis of separation of powers. (North Carolina is one state that has already passed laws guaranteeing the legislature access to executive agency information.)

Minnesota Representative Robert Vanasek, former speaker, says the new technologies will have enormous impacts on how legislators approach problems, but good public policy might suffer if legislators become too preoccupied with analyzing the effect proposals might have on their own districts at the expense of statewide considerations.

Other problems will arise as the technology moves forward and will have to be addressed as systems are implemented. Consider the ramifications of allowing members to electronically transmit amendments as bills are being considered. Not only would this significantly increase the amount of time spent in formal floor sessions, presiding officers would lose the control they now enjoy by being able to order the sequence of amendments.

These problems are nothing compared to the predicament legislators will find themselves in if they continue to ignore the opportunities of high technology. If present trends continue, legislators will be asked to handle more information and more requests, introduce and consider more bills, and do more with less. Joining the information technology parade will give them the tools they need to keep legislatures an equal branch of government.

Michigan Goes on Line

Individual computer terminals have changed the way they do things on the Senate floor.

Jacquelynn Boyle

It used to be that when Senator John Cherry wanted to catch up on paperwork during the often lengthy Michigan Senate sessions, he'd have to haul armloads of letters, files and reports over from his office across the street.

If he wanted to work on a bill or respond to a constituent's request for information during a floor debate, he'd have to send an aide to search for the reference material he needed.

But since January 1990, Cherry has been able to do all of those things and more without leaving the Senate floor or even picking up a phone.

That's when the Senate's new computer system went on line. The first of its kind in the nation, it provides 37 senators (one senator declined) with computers at their desks on the floor. The system is connected to the main Senate data base; the computers are interconnected within the chamber and to the senators' offices via a network.

"In a lull time, there's some very basic work that you can do: responding to mail, responding to messages. In fact, when you look at the data bases that are available, you can even research issues. You pull up pertinent information, think it through and write it up on the computer so it's available to you when you get into a debate," said Cherry.

Several other state legislatures are considering installing in-chamber computer systems. The Louisiana House has some components in place, and Florida is hoping to have parts of a system this fall. But Michigan's network is by far the most extensive.

"We had an interest in having a more

Jacquelynn Boyle is a staff writer for the *Detroit Free Press*.

efficient system and in creating a preeminent model nationally. I believe Michigan is the only state where the voting is by a touch-sensitive computer screen," said Bill Sederburg, vice president of Public Sector Consultants Inc. of Lansing. A state senator until last year,

Senate President Pro Tem Vern Ehlers is a strong supporter of the Michigan Senate's sophisticated computer system.

Sederburg's interest in personal computer use made him a driving force behind the project.

The idea first came up in 1984, when senators formed a committee to discuss updating the Datapoint computer system used in Senate offices. Because Datapoint was not compatible with other hardware or software, the panel chose an entirely new "backbone" network system — Novell — which enabled senators to hook in with Apples, Macintoshes and other PCs.

At the time, Michigan was laying plans to restore the 112-year-old Capitol building to its original Victorian splendor at a total cost of about $45 million. So senators decided to go one step further and install computers at their desks. Space limitations prevented the 110-member House from doing the same.

"We started with a survey of legislators, where they were in terms of their knowledge of a system and what they wanted," Sederburg said. "What they wanted was flexibility, lots of memory — senators are big on keeping files. They also wanted graphics and access to bill analyses and stuff like that. And they wanted to choose between Macintoshes and other PCs. Then we built the system around their desires and what we knew about the technology."

What they got, according to acting Senate Information Services Director Caryl Holland, was the most current technology that even allows senators to link in from home computers.

"I honestly think we've positioned ourselves so that it will be the technology we will need for the next five years or so. We won't need to replace it soon," Holland said.

The project was really in two parts. The in-office computer overhaul cost about $4 million and was accomplished over a two-year period. The price tag for the floor system was $900,000, including hardware, software and the voting system but not electronic wall boards that display the votes.

For the design and development of the system for the legislative floor, the Senate Information Services staff contracted with and worked collaboratively with Decision Resources Corp. of Washington, D.C., as system integrators.

The floor system has 47 work stations, with one for each senator, the lieutenant governor, the secretary of the Senate, the clerks at the podium and two computer technicians who control the sound and voting system. A terminal, but no key-

board, is in place in each of two press boxes, allowing the news media immediate access to proposed amendments and the ability to view votes being electronically tallied.

One unique feature of the floor system is that it's integrated into the 1879-style decor of intricately painted walls and ceilings, carved molding and heavy, ornate furniture. Senators were determined that nothing, not even modern conveniences, would mar the sense of history they hoped to achieve by restoring the chamber. Each work station is equipped with a liquid crystal display flat panel screen and a keyboard. When not in use, they fold down neatly into a tasteful wood cabinet attached to the senator's desk.

Those flat panel screens are the only sore point with Senator Vern Ehlers, who heads the Senate Computer Policy Advisory Committee. They were chosen because they are less bulky than traditional video display terminals, thus taking up less space on the crowded Senate floor. But the flat screens don't show color, which Ehlers feels is an important feature.

"It's the one thing I would fight harder for, the video screen. I would really dig my heels in and scream, because I think it's a big advantage, particularly for a person who is not used to computers," he said.

For example, Ehlers said, monitoring the vote on the flat screen can be a bit confusing. Four shades of gray are used to show whether a senator voted yes or no, was excused, or did not vote, but the shades are difficult to distinguish and the key is at the bottom of the screen. Color would make this easier.

But neither he nor anyone else is really complaining. Michigan's full-time Legislature meets in formal sessions on Tuesdays, Wednesdays and Thursdays, and senators have been able to use the hours spent on the floor much more efficiently.

Their computers have word processing, which allows them to write letters, speeches, memos and reports. Senators can access all of their office computer files, including calendars, phone messages and spreadsheets.

They can pull up all main Senate files, including proposed bills, Michigan's compiled laws, the Legislative Service Bureau and other data bases. If a bill is being debated, they can write amendments on their computers and send them

Computers at Everybody's Desk?

Michigan's automated Senate has intrigued many legislators and staff people who think a computer on every desk is the best idea since the telephone. But even if one does believe that, there are obstacles to such a system, and one of the biggest is cost.

The cost of extensive wiring, hardware, and network and software development quickly reaches into the hundreds of thousands of dollars. Because all but seven legislatures are part time, such costs can be prohibitive. Danny Jackson of the Kentucky Legislative Research Commission says many members in that state believe such costs are hard to justify.

Another impediment to automating part-time bodies, particularly those with short sessions, is the training required, which takes both time and staff. So is lack of interest on the part of the members. In a number of states, only a handful of members would like to have a computer at their chamber desk.

Space is another consideration. Some legislatures would need new chambers to physically accommodate the necessary hardware. The New Hampshire House, an extreme case with its 400 members, would be impossible to automate; the members now sit in theater-style seats without even desks.

Nevertheless, advancing technology bodes well for the future. Computers that respond to voice commands and that "understand" handwriting will reduce training requirements and eliminate the need to be familiar with a keyboard. Wireless "local area networks" may provide a simple way to connect computers, and smaller, cheaper equipment may help with the problems of space and cost.

— Steve Graff, NCSL

electronically to the clerk without having to leave their desks.

The system also offers full electronic mail, which lets senators send messages to their offices or to other senators.

"There's an intercom system where you can send messages to the entire Senate at once. It pops right into the middle of the screen. A very common one is from (Floor Leader) Phil Arthurhultz, who frequently says, 'We'll be working through lunch today,'" Ehlers said.

Since the voting system is linked to the computer network, senators can watch their screens as ballots are cast. The computer can display votes by party, by those for and against an issue and by name in alphabetical order.

You can even play computer games. "I did that a time or two," said Sederburg. "The games are not on the system, but you can hook them up yourself."

Ehlers and Sederburg said most senators have been receptive to the system. Only one, Jack Welborn, declined to have a computer at his desk, saying it was an unnecessary expense at a time when the state is experiencing severe budget problems. He votes by using an auxiliary button at his desk and must

look up front to the big screen for the results.

"Last year we had one of the most conservative members of the Senate stand up and complain that his amendment was not on the system and he wasn't going to vote until it was. He was one of the people who was leery of it in the first place," Sederburg said.

Said Cherry, who is one of the system's biggest fans: "I was somewhat computer literate when I came to the Senate, but it's like anything else — if you have the need to use it you learn more about it. My knowledge has increased because at this point it is so useful to me that if something new comes out I look at it to see what I can do with it."

Cherry said the system has also allowed him to spend more time with his family, because he can do some work on his computer at home.

"You combine that with a mobile phone and a fax machine . . ." he chuckled, adding, "What it really does is free you up to begin looking at issues in greater depth. What we engage in here is a debate over ideas. What the computer allows you to do is electronically manipulate ideas. It enhances your ability to do your job."

Trends in State Legislative Information Technology

M. Glenn Newkirk*

A decade ago state legislatures were only beginning to develop information systems capabilities. However, since then there have been dramatic changes in the scope, size, and structure of legislative information technologies. Discussions with legislative information technology directors and a review of literature point to five trends that are indicative of this maturation: the emergence of multi-vendor computing in the legislatures; the development of labor issues relating to information technology; the demise of the non-end user; the quest for legislative access to executive branch data systems; and the interest for public access to legislative data systems. These trends and others point to state legislatures as prime examples of governmental information industries.

Most students of government information technology are familiar with and follow the pioneering information systems developments in the U.S. Congress. The size, power, and sophistication of systems in the House of Representatives, the Senate, the Library of Congress, and the Congressional Research Service are well documented and noteworthy. However, in the past decade many state legislatures have developed their own high-performance, pioneering information technology applications. The applications often are known primarily in the capital cities, and frequently have drawn attention for their costs. Even small expenditures for information technology in a state legislature can be a substantial percentage of the operating budget of a legislature, thereby calling notice from the capital press corps.

But the applications in the legislatures have grown and changed. Telephone interviews with legislative information systems directors, legislative research directors, and members in 20 states that have developed their own information systems revealed that the growth and change have been substantial. Reviews of articles in periodicals that

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cover state legislatures and conversations with staff members at the National Conference of State Legislatures reinforce this conclusion.

Most of the state legislature's implementations of information technology still do not rival Congress' systems in size. Only the California legislature can claim that size of system with its significant IBM mainframe capabilities, its statewide data communication network, and its very large DEC VAX network. However, applications of local area networking technology, statewide wide-area networks, voice response systems for database inquiries, imaging technology in legislative libraries, and integration of FAX output and database retrieval give evidence of the pioneering information technology in many state legislatures.

The applications have changed the way legislatures receive and give information. This article points to several major trends that have shaped information technology in the legislatures during the past decade and shows how the trends will be magnified during the remainder of the century.

THE EMERGENCE OF MULTI-VENDOR COMPUTING

The computing world in legislatures only a decade ago was dominated by International Business Machines equipment and software. The connection was simple. Most legislatures used centralized executive agency service bureaus for their applications. Most of these service bureaus had International Business Machines computers. Therefore, most state legislatures used IBM computers and software for their applications.

Table 1 presents data from the 1977 Chartrand and Bortnick survey of the 44 state legislatures using computers at that time.[1] The dominance is clear.

IBM is in no danger of dropping out of the market. However, several changes started in the 1980s that will propel a trend toward a true multi-vendor market in the state legislatures: (1) the emergence of legislatures as independent purchasers of computer equipment; (2) the rise of third party and custom software; and (3) the tremendous availability and price-competitiveness of personal computer clones.

Table 1.   Major Computer Equipment Brands Used
in State Legislatures in the Mid-1970s

EQUIPMENT MANUFACTURER	NUMBER OF LEGISLATURES REPORTING USE OF THIS EQUIPMENT
IBM	38
Honeywell	3
RCA	1
Burroughs	1
Amdahl	1
Data General	1
Varian	1

NOTE: The number exceeds 44 because some states reported using more than one brand of computer processor.

Independent Legislative Computer Operations

When Chartrand and Bortnick completed their study in 1977, only seven state legislatures controlled their own computer systems.[2] The remainder used the service bureau facilities of a state agency. While no comparable, comprehensive survey data exist on the current situation, it clearly has changed substantially.

Issues of the *Computer Applications Staff Section Newsletter*[3] published occasionally by the National Conference of State Legislatures over the past five years indicate that at least 30 legislatures have purchased their own processing capability, larger in size than stand-alone personal computers. So, over four times as many legislatures have their own independent computer operations now as did slightly over a decade ago. This change has meant a substantial amount of information technology purchasing activity in the legislatures during the past decade. The market has opened up, and the legislatures have shown a distinctively independent bent in their purchasing behavior. In many instances, their purchasing behavior has been driven by interest in available software, regardless of the hardware platforms on which the programs run.

The Rise of Third Party and Custom Software

The legislative market for computing is not a particularly large market when compared with other private and public sectors. However, the market has been large enough to attract third party software developers and hardware vendors willing to develop custom software for the legislatures. From a firm that customizes legislative status tracking software, to a company that integrates electronic voting systems with local area network technology, to a hardware vendor that has modified its standard word processing package to handle legislative bill typing and production, a variety of companies have shown interest in the legislative market.

In the Chartrand and Bortnick study, two vendors dominated the software used to draft, print, store, and search legislation: International Business Machines and Data Retrieval Corporation, with a nearly equal distribution in the market.[4] At that time, Data Retrieval Corporation's software ran primarily on IBM's equipment. A decade later, IBM has announced that it no longer will sell its flagship products (ATMs and STIARS), forcing states to convert to other products. Furthermore, Data Retrieval Corporation has replacement products for its market-leading packages (ALTER and SIRS), and those products run on IBM and other manufacturers' equipment. When given both the requirement and the opportunity to convert their most critical applications, the legislatures opened the field and looked at a wide-range of alternatives.

Perhaps more significant for the growth of multi-vendor information systems has been the trend toward in-house development of applications in the legislatures. To develop an application prior to the 1980s, the legislative research director frequently placed a call to the state computer center and spoke with the director. Now, a legislative staff director (or a Member) will speak with a legislative information systems staff specialist who will make the classic "build or buy" decision. In more and more situations, that specialist will commence design on the application without consultation with any vendor until the "Request for Proposal" stage. The application requirements and the software tools available are more critical considerations than the hardware on which the application will run.

The Many Brands of Personal Computing

The demands for personal computing brought the opportunity for legislatures to see many alternative brands of equipment. Members reflect their communities and their communities rarely have a strong single brand loyalty for personal computers. In some instances where a computer manufacturer has a strong local presence, another vendor will have a stronger presence in another part of the state. Many legislators arrive in the state capitals from their jobs in the schools, where the presence (some would say dominance) of Apple computer equipment is obvious. The potential for hardware diversity is obvious.

Then, there are the clones. Like the society at large, Members and their staffs are barraged with news stories, case histories, and advertisements about the personal computer that fits in a coat pocket and performs computational miracles. The attractive availability, portability, and costs of these computers present strong selling points to institutions that are sometimes sensitive about spending very visible money on themselves.

Since the late 1970s, the legislatures have come to reflect the multi-vendor environment of the schools, businesses, law offices, and political campaigns around them. The legislatures no longer rely on the technology offered by only one, or even just a few vendors. They rely on numerous vendors and have become breeding grounds of systems integration. It is likely that the trend will continue as vendors' offerings and strategies change in the 1990s.

LABOR FORCE ISSUES

In this diverse hardware and software environment, legislative leaders, legislators, and legislative staff directors have started to confront the requirement of recruiting, hiring, and keeping a more technically trained workforce to use these applications. This technically trained workforce is not only in the local area network control room or in the information systems division; it is in the fiscal research office, the legislative drafting office, and the Member's own office. The issue is a simple one: legislative staff members need to be familiar with hardware, software, and applications to get their jobs done.

Fiscal analysis no longer requires only a knowledge of where the fiscal skeletons are buried and where the funds are tucked away in the state budget. Now there is a need to understand statistical measures of performance, revenue estimation techniques, and graphical presentation and analysis techniques. More non-fiscal researchers also need to know many of the same skills to prepare reports for committees and to prepare bill analyses for individual members. Attorneys more frequently need to know how to carry out their own searches of legal databases and many have become skilled users of word processing packages as bill typing tools. To work in many Members' offices, clerical staff must be able to use word processing, bill status tracking, statute retrieval, electronic mail, and electronic calendaring to provide the Member with competent, effective service.

In some staff divisions, proficiency in computer applications relevant to the work of the division has become an implicit job requirement. Only in a few legislative staff

divisions do the managers still hold the view that attorneys or researchers should not spend their time drafting documents on word processors or preparing charts for presentations. Staff analysts, researchers, and attorneys who rely exclusively on the clerical staff to process memoranda, search databases, and produce quick statistical tables simply become less efficient and less effective staff members in many instances.

So, more Members and staff managers have made familiarity with information systems technology a key element in their hiring decisions. This situation is a significant change from only a decade ago when very few Members or staff managers would have made this a job requirement. In the coming decade, the trend is likely to continue simply because the number of computer applications will proliferate in the legislatures and more legislatures that are not now automated will become automated. Additionally, more Members will require legislative staff to be competent computer users to support them—and the constituent service that has a bearing on re-election.

However, a number of important ramifications for the legislative institution stem from this trend. First, legislative working conditions and training will have to be brought into line with comparable positions in the private sector. Individuals with good technical skills in addition to substantive expertise will expect to work in a setting that provides them with technical opportunities as well as the traditional "political rush" that attracts many legislative staff members. Keeping a more technical proficient staff will force legislative managers to adopt a new outlook on providing continuous training opportunities. No longer will a willingness to provide continuing legal education or to send staff to issue seminars be the only manifestation of routine job training for legislatures.

Ironically, some legislatures already have experienced a second problem commonly mentioned in the nation's education workforce: technically trained staff members can find better pay and more stimulating technical work in the private sector. In the past, legislatures competed with executive agencies and lobbying interests to keep their staffs. Now they will find they must compete also with private companies seeking well trained professionals who can use office automation packages, local area networks, statistical packages, database management applications, and spreadsheets.

The legislative labor force is changing, in part to meet the demands of the information infrastructure being built in the legislative institutions. The legislatures' hiring practices, reward structures, and staff retention efforts will change in the next decade to reflect those labor force requirements.

THE DEMISE OF THE NON-END USER

In most states, the drive to computerization through the 1970s and the 1980s came from staff. They wanted word processing, automated bill production, legislative status tracking, and legal document retrieval systems to make their work easier. The driving requirement was the usually impossible deadline of incorporating amendments into the budget bill and having it on the floor for debate within a few hours. Only the legislative library, the public information desk, and the legislative leadership's offices needed bill status online. Only the people who actually typed and duplicated bills needed access to the bill typing system. So the information systems' end users (those with their fingers actually touching input/output devices) were relatively small in number, but they drive the expansion of information systems in the legislatures.

Table 2.   Applications in the Legislatures: 1977

INFORMATION SYSTEM APPLICATION	NUMBER OF STATES WITH APPLICATION
Bill Status Tracking	32
Fiscal—Budgetary	25
Bill Drafting	4
Statutory Retrieval	3
Bill Indexing	3
Modeling	2
Education Funding	1

However, three trends evolved in the last five years that will dramatically expand the definition of the end user. First, there is the expansion of computer applications in the legislatures themselves. Second, computers became more prevalent in the hands of Members—in their businesses and their campaigns. Third, the nature of input/output devices has changed making it more possible to have direct access to the information contained in computers.

Changing Computer Applications in the Legislatures

In their broad-based, 1977 survey of computer software in state legislatures,[5] Chartrand and Bortnick listed the computer applications used in all of the state legislatures at that time. The tabulation of all applications available in all the state legislatures is revealing.

In evaluating these data, it is important to remember a few points about the numbers. First, in most states, state agencies other than the legislature owned and operated the computer on which the application ran. Second, the legislature in many instances had only a few terminals through which they gained online access to the application. Third, many of the applications supported only the production of batch, printed reports.

Although the point could be made in several ways, the list of applications supported on all computers in the North Carolina General Assembly serves to illustrate the change in availability of computer applications that has occurred in some state legislatures in the decade and a half since Chartrand and Bortnick's survey. North Carolina has 50 Senators and 120 Representatives, approximately 150 full time staff members, and 300 session employees. Development of systems and access to the applications are controlled by the Legislative Services Commission, the General Assembly's legislative management committee made up of seven Senators and seven Representatives.

North Carolina is not alone in the changes that have occurred in legislative information systems applications in the past few years. Other legislatures, including Washington, Oregon, California, Nevada, Oklahoma, Illinois, Florida, Virginia, Maryland, Connecticut, Kentucky, and Michigan have made substantial transformations in their information systems applications availability during the 1980s. These transformations go beyond giving personal computers with word processing and spreadsheets. They include the provision of access to local area networks and statewide information networks with round-the-clock availability of critical business applications.

Table 3. Information Systems Applications Available to End Users in
the North Carolina General Assembly

INFORMATION SYSTEM APPLICATION	APPROXIMATE NUMBER OF CLIENTS ACTIVELY USING THE APPLICATION
Office Automation (word processing, electronic mail, electronic calendaring, and electronic directories)	425
Bill Status Tracking and Reporting	400
Audio Bill Status	100
Statute and Session Law Retrieval	150
Bill Drafting and Printing	55
Spreadsheet, Data Tabling, and Graphics	40
Budget/Expenditure Monitoring and Oversight System	30
Bill Draft Request Tracking System	15
SAS Statistical Package	5
DECnet/SNA Gateway to Applications on the State Computer System (including the State Accounting System, the State Personnel System, the State Corporation Licensing System, the Salary Reserve System, the Budget Transfer System, the Report Management and Distribution System, the Parking Allocation and Renting System, and the Motor Vehicle Identification System)	60
Legislative Accounting Applications (including General Ledger Accounting, Legislative Payroll, Budget Preparation, Members' Administrative Reporting System, and Fixed Asset Management)	6
Redistricting	10
Personal Computer Applications (including PC-hill typing, PC-word processing, SAS/PC, Lotus 1-2-3, OrgPlus, Harvard Graphics, MapMaster, L-Plot Property plotting, AERMOS and Fairmodel econometric modeling, Inventory Control System, MacProject Project Management, MacPaint, polyStar Data Communications, and White Pine [Macintosh] Data Communications)	40

In evaluating the list in Table 3 and the information in Table 2, several important changes have occurred. First, the vast majority of state legislatures now own and operate their own equipment. They have substantially more control over their own development decisions and implementation cycles than they did a decade ago. (In the above list for North Carolina, the only applications *not* running on legislative equipment are those accessed through a DECnet/SNA wide area network connection to the State Computer Center and outside database vendors.)

Second, in North Carolina end users can have online connection to any application to which they have authorized access through any of over 350 terminals and personal computers throughout the legislative campus. The focus on applications in most states is on providing the staff and the Members with the equipment they need for direct use of applications. There is relatively little focus on developing applications that are not "end user" oriented.

Third, virtually all of the applications run in a real-time, online environment; batch output through a central printing or inquiry service bureau operation is disappearing. Almost no one in the legislatures designs batch oriented systems that provide access to the computer through printout available after an overnight computer processing run. Most of the newer computer users in legislatures have never seen an 80-column computer card, and their lives are none the weaker for having missed this step in the development ladder.

Fourth, in the highly popular applications in North Carolina (office automation, bill status, and legal document retrieval) approximately 40 Members out of the total 170 legislators use the applications directly themselves—and the system has been available directly to Members less than two years. More and more legislators want direct access to the applications, for immediate use when staff are not available to help or when the Members are at home.

By almost any definition of the word "revolutionary," the expansion of availability of information systems applications to legislative staff and Members is revolutionary.

Members' Information Systems Skills and Expectations

During the 1970s and the 1980s, state legislatures were end users of information systems twice removed. Between them and the information systems stood (1) information systems professionals and (2) the bill typists, the bill status information desk, or the fiscal analysts.

The times have changed dramatically. In the law offices, schools, real estate firms, and insurance offices where they work, legislators use computers. They simply no longer accept a situation in which the other major environment of their professional lives— the state legislature—will not provide them with automated support. More legislators come to their official duties expecting to have an information system environment equal to or better than that in their homes and workplaces.

However, legislative campaigns are even more important sources of Members' familiarity with computer operations. While still no match for their U.S. congressional counterparts, state legislative campaigns routinely cost in the scores of thousands of dollars. In megastates, the cost of a state legislative campaign can approach or surpass the cost of running for the U.S. House of Representatives. The campaigns are becoming technically sophisticated, relying on computers to generate mailing lists, form letters, and campaign expense reports. As with the situations in their businesses, Members are becoming unwilling to have legislative offices that are less automated in producing those lists, letters, and reports than are their campaigns.

An additional point is that more Members are beginning to look for ways in which information technology can help answer their questions in the legislature. Legislators in some states have started carrying laptop computers to committee meetings and floor sessions to take their own notes—sometimes beating the formal typing and production of minutes by days. Some Members are performing secondary spreadsheet analyses of data tables produced by their own fiscal staffs, producing their own data charts for committee meetings on graphics packages. Members in some states have led movements to dial in to their legislative computers for bill status information when requested by constituents. One House of Representatives Speaker equipped his farmhouse with a

terminal and a FAX in order to exchange electronic mail with his staff and to review interim committee meeting schedules while he was back home and the legislature was not in session.[7]

So in the past decade more legislators bring to the state capitals a set of expectations about what computers should be able to do for them. The impetus for developing new applications is coming more from Members' directly expressed needs and less from staff's initiatives. Not all of their expectations are organizationally realistic, technically possible, or financial justifiable. However, the expectations are there, and they will drive the major developments of legislative information systems in the 1990s.

Changing Input/Output Capabilities

As mentioned before, most end users of computers now missed the days of plug boards and computer cards. But a focus on changing from computer cards to workstation keyboards substantially misses the change that has started in recent years.

Table 3 indicated that the North Carolina General Assembly supports an audio bill status system. This system assists callers to inquire on the status of legislation by keying in bill numbers on a touch tone telephone keypad. The computer software searches the same database as that used by the system's terminals and sends a verbal description of when the bill was introduced, who sponsored it, its latest status step, and the date of this last action. This system has been operational since early 1987 in North Carolina where it has been used by legislators who have never sat at a computer keyboard. Similar systems are being installed in several other states, including Hawaii and Washington. The potential base of users for this application is limited to anyone with access to a touch tone telephone.

The Michigan Senate recently installed a local area network on the floor of the Senate chamber. Among its many features is complete integration with the Senate's electronic voting system. Members, who have personal computers custom-designed into their floor desks, can cast their votes either by pressing the traditional green or red buttons or by pressing "YES" or "NO" areas on touch-screens connected to their personal computers. There is no typing required. They can use the touch-screen feature, the mouse, or the more traditional buttons. The information system records the votes immediately and captures text data required for publishing the daily journal of proceedings in the Senate's clerical offices.[8]

One of the greatest areas of potential growth in computer output technology is with the FAX machine. The ability to send FAXs directly from information systems (personal computers and integrated office automation systems) is becoming relatively common. However, one state is designing a system that will allow staff and Members to FAX output directly from the bill status system to constituents, the press, and others who request the service. The system will work in a simple and straightforward manner:

- A Member, in the course of a conversation with a constituent, calls a legislative staffer with a request for information on a particular bill; the Member remains on the phone line.
- The staff member searches the bill status database and finds the information in question.

- The staffer executes a function on the bill status menu, enters a FAX number, and sends the bill history and digest of the legislation directly to the Member's FAX.

The technology to support this application exists in one state legislature that is integrating the components and planning a test of the application in early 1991.

Chartrand and Bortnick defined peripheral equipment as "a class of devices which can be connected to a computer over an electrical circuit for communication with the computer."[9] For all intents and purposes, the peripheral equipment for end users of legislative information systems in the 1990s will continue its expansion to include optical scanners, telephones, FAX equipment, and a host of other devices that were not considered computer peripherals only a few years ago. The "non-end user" of a legislative information system will find it very difficult indeed to function in the legislative environment in only a few years. Indeed, the wide variety of input and output devices for computers will mean that everyone in the legislature will use computer systems directly as hands-on end users.

LEGISLATIVE ACCESS TO EXECUTIVE BRANCH DATA

Apart from several critical applications that legislatures themselves have (bill typing and printing, bills status reporting, office automation, and legislative accounting), the data they need most are on executive agency computers. On those computers reside data about state budgets and expenditures, personnel, agency performance, and public project management. Legislators know the data are there and they increasingly want access to them as decision support information for the policies they are making and changing.

However, getting direct access to the data sometimes is not easy even after the technical obstacles disappear. In New Hampshire, the Governor and the legislature found themselves in disagreement over the legislature's right and ability to have direct access to state financial data on the executive's computers. In North Carolina, the General Assembly anticipated the need for information from executive agency computers and enacted the following statute *prior* to the development of the legislature's computer capabilities:

> 120-32.01 Information to be supplied.
>
> (a) Every State department, State agency, or State institution shall furnish the Legislative Administrative Office and the Research, Fiscal Research, and Bill Drafting Divisions any information or records requested by them. Except when accessibility is prohibited by a federal statute, federal regulation or State statute, every State department, State agency, or State institution shall give the Fiscal Research Division access to any data base or stored information maintained by computer, telecommunications, or other electronic data processing equipment, whether stored on tape, disk, or otherwise, and regardless of the medium for storage or transmission.[10]

This law, passed in 1984, is indicative of the desire in many legislatures to give an operational definition to the notion that legislatures need information from the agencies

(1) to carry out their policy-making roles, (2) to carry out their oversight roles, and (3) to respond to constituent inquiries. Only once has the legislature had to remind the Executive Branch formally of the existence of this statute in order to obtain the access it requested to a database.

As more data are stored on executive systems, legislatures will want direct access to more data—and the disagreements such as those experienced in New Hampshire and North Carolina are likely to be re-enacted in other states. It is possible that legislative requests for access to some executive agency data will provide new constitutional struggles to define once again a separation of powers that has been breached by information systems technology.

EXTERNAL ACCESS TO LEGISLATIVE INFORMATION SYSTEMS

As the legislatures' workloads have increased with critical issues, the press, the public, and the lobbyists have paid more attention to the workings of the legislatures. Not surprisingly, the legislatures have become the focus of demands from these groups for access to their information systems. These systems are viewed as the repositories of a great deal of data about what is going on in the legislatures and the states.

One author has pointed out that three state legislatures in the 1970s (Alaska, Illinois, and Virginia) permitted access to some of their databases; by 1985 the number had risen to 11; and by 1990 the figure rested at 21. Every five years, the number of states providing public access to legislative databases has approximately doubled.[11]

The use of the phrase "public access to legislative databases" is usually used imprecisely and often inaccurately. First of all, the access is often for a fee, and the fees can be as high as $1,500 per year plus an online transaction charge. Additionally, the access is often through dial-in modem from personal computers. Very few people in the public at large can afford such usage charges and have the necessary equipment. The "publics" are usually the executive agencies, the press, and lobbyists who need the information to perform their daily businesses—and who have the money to buy the access.

Second, the legislative databases most often are the legislative bill tracking system and the database of state statutes or session laws. These databases usually contain data that are publicly available in the legislative libraries or the state libraries. Nonetheless, the demand for convenient access to the information through remote computer connection is there and the legislatures are supplying it.

Additionally, as they start to provide information to non-legislative users, the legislatures are facing more and more the issues of confidentiality, open access, information management policies,[12] and equitability of access.[13] The issue of non-legislative access to legislative information technology is one in which many basic values clash: openness in government, confidentiality of communications in legislative computers, information systems management and support in the legislatures, and equitable access to legislative information systems. These are some of the information technology issues that will be addressed in public forums in the 1990s.

CONCLUSION

Legislative information systems have undergone a revolutionary change in the past ten years. From the late 1970s through the mid-1980s, many legislatures commenced development of their information infrastructures. Not all participated equally in the speed of development or in the resources applied to the development. Just as in the states' polities, economies, and societies, there were the information systems "haves" and "have nots."

But starting in the late 1980s, the legislatures that had developed information systems started to confront earnestly other profound changes in their information systems. The changes related to basic management and policy questions. How will they organize and manage the people who operate the systems? How will they manage their information networks in a cost-effective manner? How will they gain access to the information they need from executive agencies? Who will have access to various legislative databases?

As they become larger information systems environments, legislatures started to have many of the same issues and concerns that are found in other large information systems operations in the executive branch and large private concerns. A list of other topics mentioned during the informal survey of legislative information systems and staff division managers is instructive and includes:

- Centralization, decentralization, or distribution of computer processing capability throughout the groups, agencies, and chambers in the legislatures;
- Centralization or decentralization of information systems management in the legislative institution between the House and the Senate and among the staff divisions;
- Use and management of the highly complex technical tools and geographic information systems that many legislatures are purchasing to use with redistricting;[14]
- Rapidly merging capabilities in computer, audio, video, and image technologies;
- Security and disaster recovery requirements;[15] and
- The surprisingly high costs of information systems maintenance and evolution.

The shift in legislatures from information systems management driven by staff to information systems development driven by Members will have profound impacts on the legislative institution. At the same time, that shift will reflect many of the organizational development trends that are occurring in the legislatures. Only one element of analysis is certain. The nation's legislatures have become heavy users of information technologies, major providers of governmental information, and insatiable consumers of information from sources outside the institution. In doing so, the legislatures have become superb examples of governmental information industries.

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4. Chartrand and Bortnick, *State Legislature Use of Information Technology*, pp. 47-48.

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6. Legislative Services Commission, *Manual for New Legislators* (Raleigh, NC: Legislative Services Commission, 1991)

7. "Mavretic Wields High-Tech Tools," *The News and Observer* (Raleigh, NC), April 2, 1990, p. 1

8. Will McClatchy, "High-Tech Senate: Michigan Legislature Installs Workstation," *Information Week* (June 4, 1990), p. 24; Caryl Holland, "Government by Screens and Keyboards," *Computerworld* (July 16, 1990), pp. 86-87; "Michigan Senate First with State-of-the-Art Computer Systems," *State Legislatures* (July, 1990), p. 10; and Tim Skubick, "Almost-New Voting Machine Is Junked," *Lansing State Journal* (Lansing, MI), November 3, 1989, p. 11A.

9. Chartrand and Bortnick, *State Legislature Use of Information Technology*, p. 43.

10. *General Statutes of North Carolina*, Chapter 120, Section 32 01. For the controversy surrounding this statute when it first was applied, see "Computer Project Plagued by Politics," *The News and Observer* (Raleigh, NC), December 18, 1987, p. 1. This controversy came to light less than one year after the North Carolina General Assembly implemented its computer network with the technical ability to access virtually all databases on the State Information Processing Service mainframe.

11. Jo Martinez, "Letting the Public in on the Process," *State Legislatures*, 15(September, 1989):24-27.

12. Ed Levine, "Policies for the Electronic Information Age," *State Legislatures*. 15(September, 1989):28-29.

13. M. Glenn Newkirk, "Electronic Democracy," *Information Week* (February 1990):60.

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Legislator Automation Study
Extracts from CASS Newsletters

Below are extracts from the Computer Application Staff Section
(CASS) Newsletters back to 1988. These provide a good insight
into how other states have automated legislative activities.

CASS is an organization of NCSL. The CASS charter is "to promote
the exchange of ideas and information on all aspects of
information systems found within legislatures". CASS has been
publishing a newsletter three times a year since about 1988.
Each state is asked to submit articles on the computer activities
in their legislature.

February 1988 CASS Newsletter

Wisconsin has implemented an integrated Legislative System of 230
PCs attached in a token-ring network with 2 minicomputers. The
network is also attached to the Executive Branch mainframe.

> "Although each legislator is allocated a printer, there are some areas with multiple office
> staff in the same room, where the power needs and heat dissipation makes this impossible.
> In these cases, a small token-ring network allows sharing one or more printers. As office
> staff move to individual offices, additional printers will be provided."

Nebraska has installed personal computers in legislators'
offices.

> "Until this year, the Nebraska Legislature has developed its computer system to provide
> support for traditional legislative activities-bill drafting, journal preparation, fiscal analysis,
> and research. This year, Nebraska has concentrated its efforts at bringing automation to
> bear on the offices of individual legislators. These efforts will culminate in the introduction
> of personal computers in the offices of each of our forty-nine members. Following is a
> synopsis of our activities.
>
> Under the direction of the Executive Board, the Nebraska Legislature began converting its
> bifurcated computer system to an integrated data and text processing system in 1981. A
> year later that system was operational. From 1981 to 1987, computer support was
> directed at the official documents of the legislature. These public records were generated
> largely by the offices of Bill Drafting, Fiscal Research, and Clerk of the Legislature.
> Consequently, these were the first offices to be automated.
>
> Committee staff, hired and supervised by each committee chairperson, also produce public
> records for the legislature (e.g. committee statements, notices of public hearings, and
> transcripts). To complete the record keeping process, committee records were brought
> under the operation of the computer system. Since committee staff is physically located in
> the office of the committee chairperson, the process brought computer terminals to the
> offices of some individual members. The resultant efficiencies of computerization caused

staff to apply the existing hardware and software technology to support the activities of those individual members.

An evaluation of the activities of each legislator's office revealed significant energy devoted to receiving and sending correspondence, filing documents, tracking constituent requests, and scheduling of legislators' time. Although the current computer system could create a positive impact on these activities, it was not designed for this purpose. It was inefficient. In any event, nearly two-thirds of the membership did not have direct access to computer terminals. Further enhancements to the legislature's computer system were necessary if the system were to be used to support a legislator's office.

A review of the 1981 Legislative Automation Needs Assessment Study provided the basis for understanding the office automation needs of legislators. The findings and conclusions of this study were augmented by additional evaluations of the operation of member's offices. As expected, this study revealed that legislators performed many tasks beyond their capacity to act on legislation. The study revealed that Nebraska's computer system supported legislator demands when it came to legislation, but failed to support their other duties. Office automation had not effectively been brought to individual legislative offices.

The data processing staff began to look at the personal computer as an alternative to the current mainframe system. Since the legislative system operates on a billable system, the study revealed that, in addition to improved staff efficiency, automation through the purchase of personal computers had a break-even point of 3.4 years.

The analysis noted the dual role of a legislator. It recognized a member's need to access information relating to legislation. It also considered the need to interact with constituents and to manage their office in a professional manner. Legislators required immediate access to computers, printers and advanced word processing systems.

A proposal was developed and adopted by the Legislature. The proposal will carry out staff recommendations in three phases.

Under Phase I, personal computers and printers would be purchased for installation in those offices which do not have a computer terminal. Because of the reluctance of members to install equipment during a legislative session, under Phase I, these devices would act as stand alone word processors. Phase I was completed December 15, 1987.

In Phase II, a local area network would be installed to link the personal computers purchased during Phase I. This network will in turn be connected to the Legislature's mainframe computer system. Phase II will be accomplished in the fall of 1988.

Under Phase III, additional personal computers and printers will be purchased and added to the local area network. These devices will be installed in the offices of committee chairpersons. On completion of Phase III, each legislator's office will be supported by a personal computer which in turn will have access to the legislature's host applications. This phase will also be completed in the fall of 1988.

Data processing staff wrote the RFP and participated in the competitive bid process for the selection of equipment. In August 1987, the IBM bid was selected. Under that proposal, the legislature will purchase IBM PS Model 50's and Quietwriter III Printers. The local area network will be supported by the IBM Token Ring through an IBM PS Model 80 designated as the file server. The Model 80 will in turn be connected to the state's IBM 3090/400 through a 3174 Control Unit modified to support the token ring. OS/2 extended edition will provide the communications for the network. Displaywrite 4 was selected as the word

processing support package. This product will interact with Displaywrite 370 resident on the host. A constituent tracking system will be written in dBase III and will reside on each personal computer. The total cost of the project equals $350,000.

The purchase of personal computers and printers, the installation of a local area network, and the connection of the network to the mainframe represents another step in automation for Nebraska's Legislature. In keeping with the overall goal of maintaining an integrated computer system, to prepare for installation, and to provide time to write applications necessary to fully implement the system, a test project will be conducted by the data processing staff within the Research Division. There, a token ring connected to the host will be installed in January 1988. Although communications will differ from analysts to the environment under which the system will operate. This should facilitate a smooth transition before the 1989 legislative session, when the full system will be operational."

Oklahoma Senate

"In the Fall of 88, the Senate contracted to have approximately forty Macintoshes installed in the Senate as part of a pilot project for the 1988 legislative session. Ten of the forty-eight members received Macintoshes. The members chosen were either part of Leadership or committee chairs. The remaining Macs were installed in the legislative bill drafting, research and fiscal staff areas."

Pennsylvania

"The Pennsylvania Legislative Data Processing is currently supporting over 700 on-line and remote users including legislative district offices. PROFS, and electronic office system marketed by IBM, is used as a menu system providing scheduling and electronic mail. It is supplemented with Displaywrite for wordprocessing."

May 1988 CASS Newsletter

California has IBM terminals connected to an IBM 3081 mainframe in members' and committee offices, in research and caucus offices, and in joint support agencies.

Each member's district office has a DEC Micro VAX II minicomputer installed.

The Oklahoma Senate installs a Macintosh computers and Appletalk network.

"It has transported a number of senator's offices into new vistas of constituent support and clerical efficiency."

"Senators' offices use Microsoft Works software primarily and the research, bill drafting, fiscal and clerical staffs use Microsoft Word, Works and Excell....".

July 1988 CASS Newsletter

Wisconsin uses PCs attached to an IBM minicomputer to provide a constituent database to members' offices. It allows members to create their own constituent database and to create mailing labels and personalized form letters. It also has a function called questionnaire processing, which has the following

features: preparation of the legislator's questionnaire, data entry of the constituent's response, and tabulation of questionnaire results.

Connecticut legislators have access to the Legislative Information Network through individual Cypress telephone terminals.

Washington

> "The Legislative Service Center staff is designing a support system for the members of the Senate.... . This system will provide senators and their staff with new tools to handle information developed on constituents."

The Michigan Senate contracts with a consulting firm named WW to study the information needs of the Senate. WW will provide 5 reports.

    (1)   evaluation of the Senate's existing system and recommendations for interim improvements;

    (2)   survey of leading-edge technology that the Senate might use to develop a preeminent system;

    (3)   a definition of the preeminent model system;

    (4)   a definition of a target system that will recognize funding and time constraints;

    (5)   an implementation plan for the target system.

> "As a background for preparing these reports, WW interviewed every senator who would take the time to be interviewed and most of the key staff persons. Every Legislative staff person was sent a questionnaire on which they were asked to define their information needs and desires. From these interviews and questionnaires, WW distilled a list of "Critical Success Factors" which were compiled and used as the basis to define the functionality of the preeminent model information system."

October 1988 CASS Newsletter

Missouri has developed a constituent management program that runs on the PC. The program is written in Clipper/Dbase.

> "The program provides a means of storing basic information on constituents in members' districts. In addition, the program allows members to assign characteristic codes, store an unlimited number of notes for each constituent, and use a simple.... word processor."

New Jersey supports 120 legislative district offices located throughout New Jersey with a Wang system.

The Washington House and Senate have a LAN using a 3Complus server with WordPerfect, 3+Mail E-Mail, an in-house-developed constituent organizer program, and other utilities. There are about 55 people on the network.

May 1989 CASS Newsletter

Oklahoma has 40 Mac's linked up with Apple Talk

"We have about a dozen senators with the computers, and their offices are models of output, constituent relations and efficiency as a result."

The Nebraska Senate automates Senator's offices using PROFS on an IBM mainframe for database applications and current legislative information. Displaywrite 4 is used on the PC. Senator's offices are connected through a LAN.

Nebraska's Legislative Fiscal Office uses WordPerfect on PS/2s. They just converted from a Wang.

North Carolina

"The Legislative Services Commission has authorized expansion of access to the Legislative Data Network into 30 more Members' offices in the next few months"

California's new information system links the home offices of the state's 120 legislators. California has installed DEC MicroVAX-II computers and office automation software in district offices.

"Hogan's office evaluated personal computer proposals to meet the Legislature's automation needs, but found that PC price/performance couldn't compete with the MicroVAX solution. "We felt a PC LAN would put too much system management responsibility on the users, many of whom are office workers with little computer experience." Hogan said. "In addition, PCs couldn't provide the connectivity or security that we've been able to achieve."

"Before the new information system was in place, Hogan faced skepticism from some who believed that networking an entire legislature was too complicated and too risky."

July 1989 CASS Newsletter

The Wisconsin Integrated Information System (WILIS) uses an IBM PROFS system.

"Because most legislators will not actually be using the system themselves, we have set up a delegate support to reroute their mail to a member of their office staff."

North Carolina

"The Legislative Automated Systems Division is placing terminals and laser printers in the 90 members' offices authorized to date to receive equipment , access and support. Members and their secretaries will have access to office automation, bill status, and statute retrieval applications."

North Dakota

"During the 1989 North Dakota Legislative Session, eight members (four senators and four representatives) surrendered the bill books that they had on their desks in the chambers in exchange for personal computers. The PILOT project, as it was called, was designed to see

if a PC could be used as an alternative to the voluminous bill books and other paper documents.

Available on-line to the PILOT project participants were bill text, amendment text, engrossed bill text, journal text, calendars, bill status, summaries, telephone messages, committee hearing schedules, and a personal calendar system.

Response from the participants was generally favorable with most indicating they would prefer the PC to the old bill book. No decision has been reached as to what extent the system will be made available to other members of the Legislative Assembly."

May 1990 CASS Newsletter

Florida

"1,000 IBM PS/2s have been installed since 1988, when Gustafson was elected Speaker. Approximately 1/2 of these are located in the 120 district offices. 2400 baud modems in each office provide access to the Tallahassee token-ring network and the IBM 3090-400E in the Legislative Data Center.

The mainframe houses Bill History, Bill Tracking, and Bill Drafting, among other host applications. Virtually all word processing is done on the micros, using WordPerfect 5.0; the most heavily used application by far, however, is the cc:Mail electronic mail system running on the network. It is estimated this one package saved almost 50% in staff overtime costs during the 1989 session."

May 1991 CASS Newsletter

Oklahoma

"Heidi Willoughby set up the Macintosh [networked] system to support the work of all professional staff, secretaries, and administrative personnel, as well as several senators."

"Probably the most compelling testimonial of the success of the Macintosh technology has been the excitement generated by the senators themselves.

"The biggest results have come from the ability of the senators and their secretaries to retrieve and view information differently and in an improved format," said Willoughby. "The quality of the documents and document manipulation has improved tremendously, and our senators feel that they are able to make better decisions based on this improved means of communicating data.""

North Carolina

"We are adding numerous search and print capabilities to our bill status system - planned for release in mid January. Most of the new features were requested by members who now have direct access to the system from their offices. We hope the new features will further reduce the requests for printed reports and distribute the printing function directly to laser printers in members offices."

North Dakota

"The North Dakota Legislative Assembly will expand use of computer terminals by individual legislators during floor sessions. The system instituted as a pilot project in 1989,

will be used by 16 representatives and 8 senators in 1991, with planned availability to all legislators by 1995.

Bill books, journals, and calendars are replaced by an IBM 3192 terminal. The system provides the full text of the latest version of bills, legislative journals, and legislative calendars; committee hearing schedules; status of bills; telephone messages; personal roll call votes; computer search capability of state statutes; messaging from legislator-to-legislator; personal appointments; and word processing and spreadsheet capability. All features are linked so that use of a bill number will extract information from the various features, such as, text of bill, text of amendments, committee hearings, telephone messages, and prior roll call votes."

Virginia

"The virginia General Assembly Division of Legislative Automated Systems provided on-line access to the Legislative Information System (LIS) to a record number of users. Of the 788 users, 274 were private sector, 278 were executive and judicial staff, 161 were legislative staff and 75 were General Assembly members. The LIS resides on an Amdahl 5990 with access though dial-up networks and leased SDLC networks.

The division's user services staff provides support including daily help desk, manuals and seminars. The training seminars are held one month prior to the beginning of the General Assembly session and they are well attended. Approximately 450 attended seminars this year.

New inquiries for floor and committee roll call votes were added to the legislative data which includes bill history, amendments, full text of bills, committee status, committee dockets, session minutes, and a list of legislation introduced by each legislator. Also available are searchable data bases for pending legislation, passed legislation, administrative regulation, code of Virginia and state constitution."

APPENDIX E
DESCRIPTION OF PORTABLE, LAPTOP, AND NOTEBOOK COMPUTERS

DESCRIPTION OF PORTABLE, LAPTOP, AND NOTEBOOK COMPUTERS

Portable, laptop, and notebook PCs are terms the computer industry has given to a class of portable PCs. The general term "portable", when it is applied to a PC, means that the PC has been designed to be easily packed up, moved, and set up again for use. In some cases it also means that the PC must operate for short periods of time without access to an electrical outlet, such as when on a airplane or in an airline terminal. To accomplish portability, the PC must be lightweight and small and must have battery power.

"Portability" in the PC area has evolved from the portable computer to the laptop to the notebook. Each phase has seen a reduction in weight and size and an increase in the functionality and battery life.

The computer industry's first attempt at "portability" was called the portable PC. These weighed between 20 and 30 pounds, had standard size keyboards, and had small 4- to 5-inch cathode ray tube screens. Typical dimensions were 14"W x 16"D x 6"H. They also were designed to plug into a standard electrical outlet and did not have a battery. These portable computers were first introduced in 1981 with the Osborn 1 Portable Computer. More recent portable computers have flat screens. An example of this is the IBM P70.

In its next effort, the computer industry came out with the laptop computer. They were small enough and light enough to sit on your lap during use and thus the name laptop. They weighed 10 to 15 pounds and had flat screens. The keyboard was smaller than normal size. They had batteries that would last from 1 to 2 hours, or they could plug into a standard electrical outlet. They were first introduced in 1983.

The latest form of portability developed by the computer industry is called the notebook PC. It is designed to be about the size of a note pad. Typical dimensions are 11"W x 8.5"D x 2"H. They weigh 6 to 10 pounds, have a flat color graphics screen, and have a battery life of 3 to 10 hours, depending on usage. These are by far the best attempt at portability (while maintaining all the functions of a standard desktop PC) by the computer industry to date.

Notebook Computer
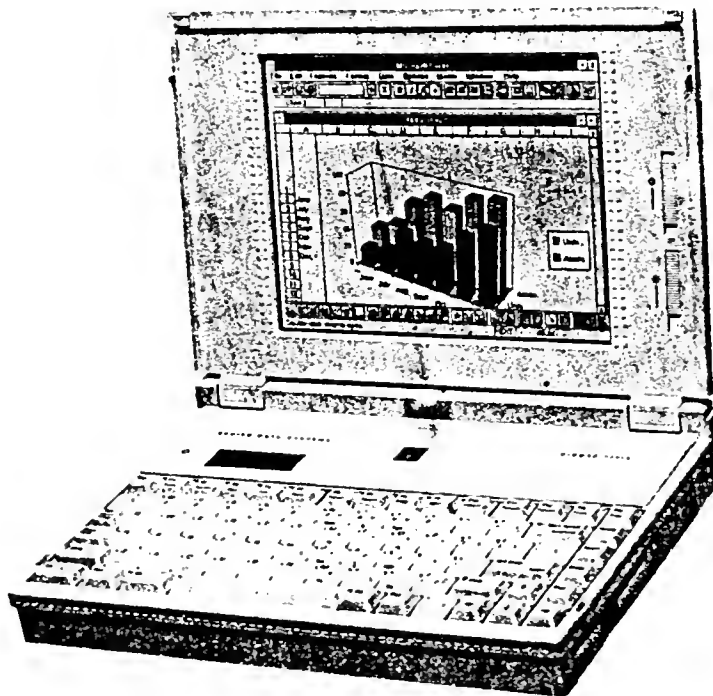
APPENDIX F
COST ESTIMATE DETAILS

This appendix contains a cost estimate for a prototype of the system for the 1995 session and an overall cost estimate for full implementation of the system as described under SYSTEM CONCEPT.

Goals of the Prototype

(1)   To determine if the overall structure of the proposed system is adequate to meet the legislators needs. (The proposed system is PCs on a network using basically the same software that the current staff network uses.)

(2)   To determine if notebook PCs will meet the needs of legislators. There are questions about the screen not being large enough and readable enough, the keyboard being too small, and battery life not being long enough.

(3)   To define data that legislators would like to access.

(4)   To define the ways in which the legislators will want to access the data, e.g., menu structure, screen layout, etc.

(5)   To provide more accurate information on which to base an overall cost estimate of the system.

(6)   To identify impacts of the overall implementation on office and space limitations. For instance, is there enough room on legislators' desks for a PC and where will servers and printers be located.

(7)   To identify and address policy issues.

Prototype Components

Components of the prototype are as follows:

(1)   Twelve notebook PCs (3 in each party in each house).

(2)   Two HP LaserJet IIISI printers with print servers (1 for the House and
        1 for the Senate).

(3)   One FTE (Systems Analyst) to supplement existing staff in planning
        and implementing the prototype.

(4)   The notebook PCs will attach to the current Legislative Branch
        Network, and thus additional network servers are not needed.
        However, data communication charges for each attachment to the
        network will be necessary. Testing the use of the system on the
        House and Senate floors, House and Senate offices, and House and
        Senate committee rooms should be done.

(5)   Access to bill text and bill status should be implemented.

Cost of the Prototype

These costs will have to be budgeted for in the FY 94-95 budget and not the
FY 95 session feed bill. The money is needed at least 1 year before the FY
95 session so that hiring, planning, and implementation can take place.

ITEM	UNIT COST	QTY	TOTAL	COMMENTS
Notebook PC	$4,000	12	48,000	See notebook PC prices on attached spreadsheet
Notebook PC software	$500	12	6,000	DOS, WordPerfect, Lotus, etc.
HP Laserjet IIIsi Printer with print server.	$4,186	2	8,372	Uses printer network interface card
Systems Analyst - Grade 17	$38,983	1	38,983	
Access Bills and Bill Status	$15,000	1	15,000	Mainframe development costs
Misc. supplies, etc.	$5,000	1	5,000	
Training	$200	12	2,400	
Network Connect charges and Installation.	$1,040	12	12,480	$80 per installation plus $40 per month per jack for 24 months
TOTAL			136,235	

Notebook PC Prices from State Term Contract as of 8/92

ITEM	DEL 320N+	DEL 320NC Color Display[4]	DEC 320P	IBM N51 SLC[3]	IBM P70[2] Portable	IBM CL57 SX[4] Color Display
Notebook Computer 386SX, 20MHz, 80MB HD	$2,454	$2,946	$2,370	$1,880	$3,184	$4,428
Bring to 6MB Memory	137	137	332	685	118	685
FAX/Modem	275	275	0	303	296	303
Mouse	136	136	114	62	65	62
Carrying case	94	94	142	79	111	95
Surge Protector	75	75	75	75	75	75
TOTAL	$3,171	$3,663	$3,033	$3,084	$3,849	$5,648
1st Year Maintenance[1]	0	0	0	0	0	0
2nd Year Maintenance	284	318	312	206	269	416

NOTES: - [1]1st year maintenance on all the above notebooks includes onsite repair, except for the DEC 320P, which costs $312 to upgrade to onsite.

- [2]The IBM P70 has 120MB hard drive and is a portable. It weighs 20 lbs., compared to the IBM N51 SLC, which weighs 6.2 lbs.

- [3]The IBM N51SLC is a 16MHZ 386sx. The other notebooks are all 20MHZ.

- [4]The DEL 320NC and the IBM CL57 SX have flat screen color displays.

Overall System Cost Estimate

The attached is an estimate of the cost to fully implement a computer system for use by legislators. This cost is provided for a 5-year period to cover the ongoing costs associated with any computer system. The estimates are based on volume of use and expectation of use of the system similar to the use of the current Legislative Branch Network by the legislative staff. The use of the final system implemented may not be similar to that currently being used by the staff, and thus this cost estimate may be inaccurate. A prototype of the proposed system can be used to more accurately determine potential usage of the system and thus more accurately determine costs.

Assumptions

The following assumptions were used to make the cost estimate:

(1)   The system will be used for the entire biennium, not just for the 90-day session every 2 years. The legislators will take the PC home for the interim. They will be able to dial in for E-Mail, etc. They will be provided with a printer for home use.

(2)   The PC application software prices are for the stand-alone prices of the software, not the networked version. This is necessary because the PC will be taken home during the interim.

(3)   The $4,000 price for a notebook PC was arrived at by an analysis of the notebook, laptop, and portable PCs on the state term contract. (See the above spreadsheet.) The spreadsheet shows prices for a 386sx Notebook PC. The 386sx is the bottom of the line computer processor at this point in time. The lowest price notebook on the spreadsheet was about $3,000. It was felt that in order to purchase a notebook PC that would last the full 5 years of the life cycle that

more than the bottom of the line notebook was necessary. Thus the price of $4,000.

(4)   Full implementation of the system begins during the first year; i.e., all 150 legislators will have notebook PCs and access to the system during the first year.

(5)   The first year is a session year. Session year costs are typically more.

(6)   Development work to customize the system will be done by the three programming FTE during the interim.

Possible Reductions

Several steps can be taken to reduce the overall system costs. However, in most cases this will cause a reduction in the functionality and features provided by the system. The following describes some steps that can be taken to reduce costs.

(1)   Less than 150 users of the system.

(2)   Legislators would not take the notebook home during the interim. This would result in a savings in the phone charges for dial up, fax/data modem in the notebook PC, home printers, and stand-alone software costs as opposed to networked software costs.

(3)   Use standard PC instead of notebook. Desk space for House members is a problem if standard PCs are used. Also, the savings may not be that great because current notebook prices are only $500 to $1,000 greater than the standard PC.

(4)   Do not implement as many features of the system. Some of the application software packages could be left out (CrossTalk, Harvard Graphics, etc.). Access to some of the databases could be left out.

COMPUTERS FOR LEGISLATORS' OVERALL COST ESTIMATE

ITEM	UNIT COST	1st Year QTY	1st Year TOTAL	2nd Year QTY	2nd Year TOTAL	3rd Year QTY	3rd Year TOTAL	4th Year QTY	4th Year TOTAL	5th Year QTY	5th Year TOTAL	ALL YEARS TOTAL
–Workstation Hardware and Software												
Notebook PCs	$4,000	150	$600,000	0	$0	0	$0	0	$0	0	$0	$600,000
Notebook Maintenance	$350	0	$0	150	$52,500	150	$52,500	150	$52,500	150	$52,500	$210,000
DOS/WINDOWS/OS/2	$150	150	$22,500	0	$0	0	$0	0	$0	0	$0	$22,500
WordPerfect	$279	150	$41,850	0	$0	0	$0	0	$0	0	$0	$41,850
Lotus	$422	150	$63,300	0	$0	0	$0	0	$0	0	$0	$63,300
CrossTalk	$119	150	$17,850	0	$0	0	$0	0	$0	0	$0	$17,850
dBase/Rbase	$472	150	$70,800	0	$0	0	$0	0	$0	0	$0	$70,800
Harvard Graphics	$369	75	$27,675	0	$0	0	$0	0	$0	0	$0	$27,675
E–Mail	$75	150	$11,250	0	$0	0	$0	0	$0	0	$0	$11,250
Misc. Software Utiliteis	$100	150	$15,000	0	$0	0	$0	0	$0	0	$0	$15,000
Software Upgrades	$610	0	$0	0	$0	150	$91,500	0	$0	150	$91,500	$183,000
–Printers												
HP LaserJet IIIsi (6MB)	$3,842	8	$29,136	0	$0	0	$0	8	$29,136	0	$0	$58,272
HP LaserJet Maintenance	$728	0	$0	0	$0	8	$5,824	0	$0	0	$0	$5,824
Print server/interface card	$544	8	$4,352	0	$0	0	$0	8	$4,352	0	$0	$8,704
HP LaserJet IIP	$765	150	$114,750	0	$0	0	$0	150	$114,750	0	$0	$229,500
HP LaserJet IIP Maintenance	$200	0	$0	150	$30,000	150	$30,000	0	$0	150	$30,000	$90,000
–File Servers												
Hardware & Software	$20,000	1	$20,000	0	$0	0	$0	1	$20,000	0	$0	$40,000
Backup Server	$20,000	1	$20,000	0	$0	0	$0	1	$20,000	0	$0	$40,000
Hardware Maintenace	$1,200	0	$0	2	$2,400	2	$2,400	0	$0	2	$2,400	$7,200
Software Upgrades & Misc Software	$3,000	1	$3,000	1	$3,000	1	$3,000	1	$3,000	1	$3,000	$15,000
Peripherals	$10,800	1	$10,800	0	$0	1	$10,800	0	$0	1	$10,800	$32,400
–Supplies												
Diskettes	$10	150	$1,500	0	$0	150	$1,500	0	$0	150	$1,500	$4,500
Printer Paper	$2	1600	$3,760	1500	$3,525	1600	$3,760	1500	$3,525	1600	$3,760	$18,330
Toner Cartridges	$70	100	$6,950	150	$10,425	100	$6,950	75	$5,213	175	$12,163	$41,700
–Data Communication Charges												
150 Network Jacks for Session and 40 for interim	$280	150	$42,000	40	$11,200	150	$42,000	40	$11,200	150	$42,000	$148,400
Committee Room/Office Jacks etc.	$126	100	$12,600	0	$0	100	$12,600	0	$0	100	$12,600	$37,800
Network Jack installation/moves	$80	250	$20,000	0	$0	40	$3,200	0	$0	0	$0	$23,200
Long Distance Phone Charges (dial in)	$120	150	$18,000	150	$18,000	150	$18,000	150	$18,000	150	$18,000	$90,000
–Personnel												
3 FTE for Analysis, Programming and Network Admin.	$103,052	3	$309,156	3	$309,156	3	$309,156	3	$309,156	3	$309,156	$1,545,780
2 FTE for User Support during Session	$48,498	2	$96,992	0	$0	2	$96,992	0	$0	2	$96,992	$290,976
–System Development												
Customization of System for Legislators	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
Redesign of current databases	$5,000	1	$5,000	1	$5,000	1	$5,000	0	$0	0	$0	$15,000
–Training												
Support Staff Training	$1,000	5	$5,000	5	$5,000	5	$5,000	5	$5,000	5	$5,000	$25,000
User (Legistator Training)	$200	150	$30,000	150	$30,000	150	$30,000	150	$30,000	150	$30,000	$150,000
–Planning and Implementation	$0	0	$0	0	$0	0	$0	0	$0	0	$0	$0
			=========		=======		=======		=======		=======	=========
			$1,623,221		$480,206		$730,182		$625,832		$721,371	$4,180,811

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COMPUTERS FOR LEGISLATORS' OVERALL COST ESTIMATE

ITEM	COMMENT
-Workstation Hardware and Software	
Notebook PCs	Replacement cycle starts on 6th year. Assume no phase in for this cost estimate. Unit cost is based on attached spread sheet comparison.
Notebook Maintenance	See attached Spread Sheet comparison
DOS/WINDOWS/OS/2	
WordPerfect	Standalone version
Lotus	Standalone version
CrossTalk	Standalone version
dBase/Rbase	Standalone version
Harvard Graphics	
E-Mail	Only proviede to half of legislators (power users)
Misc. Software Utiliteis	
Software Upgrades	Unit Cost includes upgrades for all software above. Upgrade every two years
-Printers	
HP LaserJet IIIsi (6MB)	One printer for every 20 legislators. Replacement cycle is every 4 years
HP LaserJet Maintenance	Maintenance is only provided for session years. Assume first year is session year
Print server/interface card	
HP LaserJet IIP	This is the printer the legislator will take home.
HP LaserJet IIP Maintenance	Printers usually have 1 year warranty
-File Servers	
Hardware & Software	IBM PS/2 Model 95. Replacement Cycle is 4 years
Backup Server	
Hardware Maintenance	
Software Upgrades & Misc Software	Novell Upgrades and misc software
Peripherals	Additional Disk Space, Modems, CD-ROM Reeder, Tape Backup unit
-Supplies	
Diskettes	5 Diskettes per legislator
Printer Paper	60 pages e day for each legislator during session (800,000 pages). 5,000 pages per legislator nonsession year. Unit cost is per 500 pages
Toner Cartridges	This includes toner cartridges for both the IIIsi end the IIP printers.
-Data Communication Charges	
150 Network Jacks for Session and 40 for interim	$40/Month for 7 months each session year. 40 network jacks will remain active during the interim.
Committee Room/Office Jecks etc.	$18/Month for 7 months each session year
Network Jack installation/moves	$80 per jeck
Long Distance Phone Charges (dial in)	Phone charges for dial in access from legislators home to pick up E-mail etc. $10 per month for 12 months
-Personnel	
3 FTE for Analysis, Programming and Network Admin.	One Systems Analyst Grade 17, One Programmer/Analyst Grade 13, One Network Administrator Grade 16. Does not include inflation.
2 FTE for User Support during Session	2 Computer User Assistants grade 11. Does not include inflation
-System Development	
Customization of System for Legislators	Assume this will be done by current tools on the network and mainframe by current staff (including Council staff) during the interim.
Redesign of current databases	Redesign databases for acess by legislators. These are mainframe charges.
-Training	
Support Staff Training	This includes CNE training for network administrator etc.
User (Legislator Training)	Train Legislators on how to use the system.
-Planning and Implementation	Assume this will be done by the 5 FTE ebove.